

[COMMITTEE PRINT]

SUMMARY OF ACTIVITIES
OF THE
COMMITTEE ON
SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES
ONE HUNDREDTH CONGRESS



DECEMBER 1988

Printed for the use of the Committee on Science, Space and Technology

U.S. GOVERNMENT PRINTING OFFICE

23-455

WASHINGTON : 1989

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

H702-16.

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LETTER OF TRANSMITTAL

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, DC, December 19, 1988.

Hon. DONNALD K. ANDERSON,
The Clerk,
U.S. House of Representatives,
Washington, DC.

DEAR MR. ANDERSON: In compliance with Rule XI, Clause 1(d) of the Rules of the House of Representatives, there is transmitted herewith the Summary of Activities of the Committee on Science, Space, and Technology for the 100th Congress.

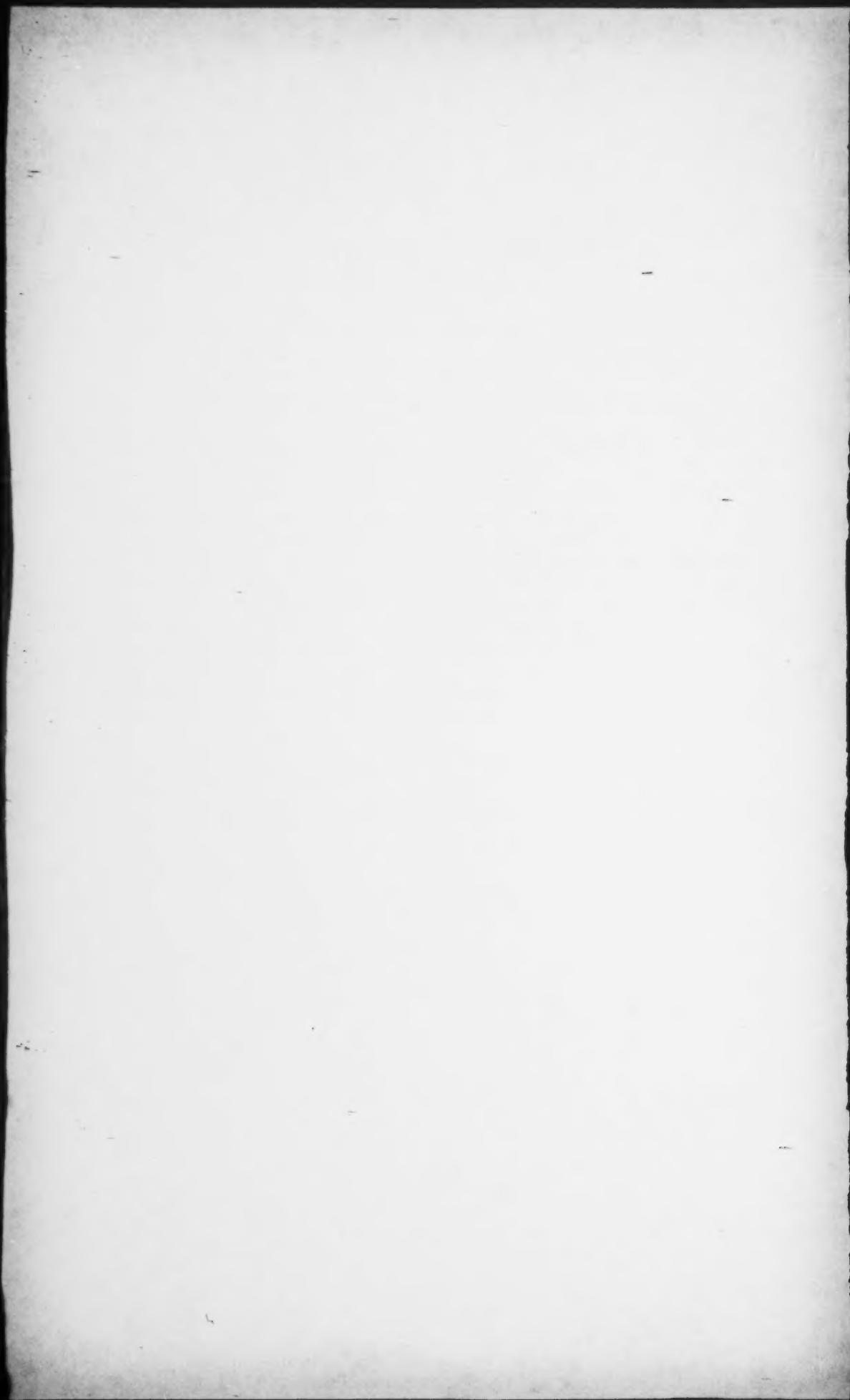
The purpose of this report is to provide the Members of the House of Representatives, and the general public, with an overview of the legislative and oversight activities conducted by this committee, pursuant to Rule X, Clause 1(r) and Clause 3(f) of the Rules of the House of Representatives.

This document is intended as a general reference tool, and not as a substitute for the hearings records, reports, and other committee files.

Sincerely,

ROBERT A. ROE, *Chairman.*

Enclosure.



CONTENTS

Committee history	Page 1
Membership of committee	6
History of appointments	7
Legislative and oversight jurisdiction of the committee	9
Membership of subcommittees and their jurisdictions	10
Chapter I—Legislative Activities of the Committee on Science, Space, and Technology	14
1.1—Public Law 100-107, Malcolm Baldrige National Quality Improvement Act of 1987	14
1.2—Public Law 100-147, National Aeronautics and Space Administration Authorization Act of 1988	15
1.3—Public Law 100-203, The Omnibus Reconciliation Act	20
1.4—Public Law 100-204, Foreign Relations Authorization Act, Fiscal Years 1988 and 1989	20
1.5—Public Law 100-223, Airport and Airway Safety and Capacity Expansion Act of 1987 and H.R. 1517, the Aircraft Collision Avoidance Act of 1987	21
1.6—Public Law 100-235, The Computer Security Act of 1987	25
1.7—Public Law 100-252, The Earthquake Hazards Reduction Act of 1977 Reauthorization	27
1.8—Public Law 100-408, The Price-Anderson Amendments Act of 1987	30
1.9—Public Law 100-418, The Omnibus Trade and Competitiveness Act of 1988	31
1.10—Public Law 100-441, The Continental Scientific Drilling and Exploration Act	35
1.11—Public Law 100-476, the Federal Fire Prevention and Control Act Authorization for Fiscal Years 1989, 1990, and 1991	37
1.12—Public Law 100-519, The National Institute of Standards and Technology Authorization Act for FY 1989	38
1.13—Public Law 100-570, The National Science Foundation Authorization Act of 1988	39
1.14—Public Law 100-591, The Aviation Safety Research Act of 1988	43
1.15—Public Law 100-627, Title II, Marine Protection, Research and Sanctuaries Act Reauthorization	44
1.16—Public Law 100-636, The National Ocean Pollution Planning Act Reauthorization	46
1.17—Public Law 100-657, The Commercial Space Launch Act Amendments of 1988	47
1.18—Public Law 100-680, The Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988	50
1.19—Public Law 100-685, The National Aeronautics and Space Administration Authorization Act, 1989	52
1.20—Public Law 100-697, The National Superconductivity and Competitiveness Act of 1987	56
1.21—H. Con. Res. 290/S. Con. Res. 131, The Establishment of a United States Decade for Natural Disaster Reduction	57
1.22—H. Res. 55, In Memorium of the Crew of the Space Shuttle "Challenger"	59
1.23—H. Res. 369, To Commemorate the 25th Anniversary of the Cerro Tololo Inter-American Observatory	59
1.24—H. Res. 450, Research and Development on Fatigue and Corrosion in Aging Aircraft	61
1.25—H. Res. 574, Commemorating the Successful Return to Flight of the Space Shuttle "Discovery"	62

VI

	Page
Chapter II—Other Legislative Activities of the Committee on Science, Space, and Technology.....	63
2.1—S. 1081, The National Nutrition Monitoring and Related Research Act of 1988.....	63
2.2—H.R. 791/H.R. 3676, The Geological Survey Water Resources Organic Act.....	65
2.3—H.R. 2253, The Ground Water Research, Development and Demonstration Act.....	67
2.4—H.R. 1510, Inventions in Space.....	68
2.5—H.R. 1522, The Federal Fire Prevention and Control Act of 1974 Reauthorization.....	68
2.6—H.R. 2160, The National Bureau of Standards Authorization Act for Fiscal Year 1988.....	69
2.7—H.R. 2330, The National Science Foundation Authorization Act for Fiscal Year 1988.....	70
2.8—H.R. 2355, The Environmental Research, Development, and Demonstration Authorization Act of 1987.....	72
2.9—H.R. 2916, The Technology Competitiveness Act of 1987.....	73
2.10—H.R. 3704, The Hotel and Motel Fire Safety Act.....	76
2.11—H.R. 3779, The Controller Performance Research Act.....	78
2.12—H.R. 4502/S. 1966, The Biotechnology Science Coordination and Competitiveness Act.....	79
2.13—H.R. 4505, The Department of Energy Civilian Research and Development Authorization Act for Fiscal Year 1989.....	82
2.14—H.R. 5132, The National Laboratory Competitiveness Act of 1988.....	84
2.15—S. 1667, National Oceanic and Atmospheric Administration Atmospheric and Satellite Program Authorization Act of 1987.....	86
2.16—Committee Resolution 100-1/H. Con. Res. 369, Science Attache Resolution.....	87
Chapter III—Oversight, Investigations and Other Activities of the Committee on Science, Space, and Technology, Including Selected Subcommittee Legislative Activities.....	89
3.1—Committee on Science, Space, and Technology.....	89
3.1(a)—Agency Posture Hearings.....	89
3.1(b)—Technology Policy Task Force.....	89
3.1(c)—Committee Meeting with U.S. Department of State Science and Technology Officers.....	90
3.1(d)—U.S.-Japan Inter-Parliamentary Meeting.....	91
3.1(e)—The Flight of the Voyager.....	92
3.1(f)—International Technology Transfer.....	92
3.1(g)—NASA's Response to the Committee's Investigation of the Challenger Accident.....	93
3.1(h)—Superconductivity.....	94
3.1(i)—The University Research Facilities Revitalization Act of 1987 (H.R. 1905).....	94
3.1(j)—Review of the Results of the 1987 Antarctic Expedition to Study Ozone Depletion.....	95
3.1(k)—The Superconducting Super Collider (SSC).....	96
3.1(l)—U.S.-Poland Joint Commission on Science and Technology.....	96
3.1(m)—Meeting with Italian Senate Committee on Industry, Commerce, and Tourism.....	97
3.1(n)—Meeting with Italian Chamber of Deputies Committee on Environment, Interior, and Public Works.....	97
3.1(o)—Implications of the Licensing Decision on the Chinese Long March Vehicle.....	98
3.2—Subcommittee on Investigations and Oversight.....	99
3.2(a)—Hearings by the Committee on Science, Space, and Technology.....	99
3.2(b)—Hearings by the Subcommittee on Science, Research and Technology.....	99
3.2(c)—A Hearing by the Technology Policy Task Force.....	99
3.2(d)—Legislative Activities.....	99
3.2(e)—Investigative Activities.....	99
3.2(f)—Impact of the Ammonium Perchlorate Plant Explosion in Henderson, Nevada.....	99
3.2(g)—The Cutting Edge: Science and Technology for America's Future.....	101
3.2(h)—Space Shuttle Software Investigation.....	103

VII

Chapter III—Oversight, Investigations and Other Activities of the Committee on Science, Space, and Technology, Including Selected Subcommittee Legislative Activities—Continued

3.3—Subcommittee on Natural Resources, Agriculture Research and Environment

3.3(a)—Stratospheric Ozone Depletion	104
3.3(b)—Oversight of the FY 1988 Budget Request for Department of Energy Biological and Environmental Research	105
3.3(c)—The Future of the Landsat System	107
3.3(d)—Conservation of Biological Diversity	108
3.3(e)—Global Climate Change and Climate Act Reauthorization	110
3.3(f)—Opportunities for International Scientific Cooperation to Control AIDS	111
3.3(g)—Groundwater Resources in Albuquerque, New Mexico	112
3.3(h)—The Future of Long Island's Groundwater Resources	113
3.3(i)—Modernization of the Weather Service	114
3.3(j)—The Status and Future of the Landsat System	116
3.3(k)—Environmental Health in the Twenty-First Century	119
3.3(l)—Review of the FY 1989 Environmental Protection Agency Research Program Budget Request	120
3.3(m)—Oversight of the National Acid Precipitation Program	121
3.3(n)—Field-Testing of Genetically-Engineered Organisms	122
3.3(o)—The Quality of Health Care: Information for Consumers	123
3.3(p)—Technologies for Conserving Species: Saving the Endangered Rhinoceros	124
3.3(q)—Technologies for Remediating Global Warming	125
3.3(r)—H.R. 5000, the Recyclable Materials Science and Technology Development Act of 1988: Plastics in the Environment	125
3.3(s)—Remediation Strategies for the Stringfellow Superfund Site	127
3.3(t)—Review of Indoor Air Quality Programs and H.R. 5373, the National Indoor Air Quality Act	129
3.3(u)—The National Biological Diversity Conservation and Environmental Research Act (H.R. 4335)	130
3.4—Subcommittee on Energy Research and Development	133
3.4(a)—Nuclear Fission R&D	133
3.4(b)—Conventional Light Water Reactor (LWR Development)	134
3.4(c)—Multi-Megawatt Terrestrial Power Plant (MTP)	135
3.4(d)—Modular High Temperature Gas-Cooled Reactor (MHTGR)	135
3.4(e)—Civilian Reactor Development (CRD) Plan	135
3.4(f)—Space Nuclear Power Programs	135
3.4(g)—Technology Transfer Programs	135
3.4(h)—Nuclear Waste Management	136
3.4(i)—Uranium Enrichment	137
3.4(j)—Byproducts Utilization (Subcategory of Remedial Action & Waste Technology)	138
3.4(k)—Clean Coal Technology Demonstration Program	138
3.4(l)—Fossil Energy	139
3.4(m)—Conservation R&D	139
3.4(n)—Solar/Renewables	140
3.4(o)—Magnetic Fusion	140
3.4(p)—Supporting Research and Technical Analysis	141
3.4(q)—General Science and Research	143
3.4(r)—Hydrogen: Fuel of the Future	144
3.4(s)—High Temperature Superconductivity	145
3.4(t)—Geosciences	145
3.4(u)—Renewable Energy	146
3.4(v)—Global Prospects for U.S. Coal and Coal Technologies	146
3.4(w)—Fossil Energy	147
3.4(x)—Energy Conservation R&D	147
3.4(y)—Solar/Renewables	148
3.4(z)—Nuclear Fission R&D	148
3.4(aa)—Basic Research User Facilities	150
3.4(bb)—Supporting Research and Technical Analysis	150
3.4(cc)—General Sciences Program	151
3.4(dd)—Superconducting Super Collider (SSC)	152
3.4(ee)—Magnetic Fusion Energy	153
3.4(ff)—Other R&D Programs	153

VIII

Page

Chapter III—Oversight, Investigations and Other Activities of the Committee on Science, Space, and Technology, Including Selected Subcommittee Legislative Activities—Continued	
3.4—Subcommittee on Energy Research and Development—Continued	
3.4(gg)—The Renewable Energy and Energy Conservation Commercialization and Development Act (H.R. 4226).....	154
3.4(hh)—State of the U.S. Oil and Gas Industry.....	154
3.4(ii)—High Temperature Superconductivity and Technology Transfer.....	155
3.4(jj)—Establishing a Uranium Enrichment Corporation.....	155
3.5—Subcommittee on Science, Research and Technology.....	156
3.5(a)—Federal Information Policy Mechanisms.....	156
3.5(b)—Superconductivity (H.R. 3024, H.R. 3048, H.R. 3217).....	157
3.5(c)—The Role and Balance of Federal R&D Support.....	157
3.5(d)—The Role of Science and Technology in Competitiveness.....	158
3.5(e)—Hearing on Research and Competitiveness in the Construction Industry.....	159
3.5(f)—Field Hearing on "Scientific and Technical Literacy in the Workforce" (Raleigh, North Carolina).....	160
3.5(g)—Whittier Narrows, California Earthquake: Lessons Learned.....	161
3.5(h)—Field Hearing on Federal Science and Technology Support for Historically Black Colleges and Universities.....	162
3.5(i)—The Fastener Quality Assurance Act of 1988 (H.R. 5051) and the Standardization of Measurement Act of 1988 (H.R. 5120).....	164
3.5(j)—Other Standardization Legislation and "The Standardization of Weights and Measures".....	166
3.5(k)—Hearing on Women, Minorities and the Disabled in Science and Technology.....	168
3.5(l)—Hearing on the Privatization of the National Technical Information Service (NTIS).....	168
3.5(m)—Hearing on Oversight of the Office of Science and Technology Policy.....	169
3.5(n)—Fire Safety in Multifamily Housing.....	170
3.5(o)—Technologies for Remediating Global Warming.....	172
3.5(p)—New Directions in Home Video.....	173
3.5(q)—Steel Research and Markets of the Future.....	174
3.5(r)—Hearing on U.S./Japan Cooperative Agreement in Science and Technology.....	175
3.5(s)—Field Hearing on University/Industry Alliances (St. Louis, Missouri).....	176
3.5(t)—Field Hearing on Economic Development Through Technology Transfer, Denver, Colorado.....	177
3.5(u)—Field Hearing on Photonics.....	178
3.6—Subcommittee on Space Science and Applications.....	179
3.6(a)—Hearings on the Space Shuttle Program.....	179
3.6(b)—Review of NASA's Long Range Goals.....	180
3.6(c)—Space Station Oversight Hearing.....	180
3.6(d)—Hearing on the Atlas-Centaur Accident.....	181
3.6(e)—Shuttle Solid Rocket Motor.....	181
3.6(f)—Examining the Health of the Commercial Launch Industry.....	182
3.6(g)—Review NASA's Implementation of NRC Recommendations on Space Station.....	183
3.6(h)—International Space Policy in the 1990's.....	183
3.6(i)—Hearing on the Shuttle Solid Rocket Motor.....	183
3.6(j)—Hearing on Future Goals in Space, New Hampshire.....	184
3.6(k)—Hearing on Future Goals in Space, Iowa.....	184
3.6(l)—Hearings on the Commercial Space Launch Act Amendments of 1987.....	185
3.6(m)—Hearing on Orbital Space Debris.....	185
3.6(n)—To Establish a National Mars Commission (H.R. 3858).....	186
3.6(o)—Space Settlement Act of 1988 (H.R. 4218).....	186
3.6(p)—John C. Stennis Space Center (H.R. 4560/Executive Order 12641).....	187
3.7—Subcommittee on International Scientific Cooperation.....	188
3.7(a)—Hearings on the Future of the Landsat System.....	188
3.7(b)—International Cooperation on the Superconducting Super Collider.....	188

IX

	Page
Chapter III—Oversight, Investigations and Other Activities of the Committee on Science, Space, and Technology, Including Selected Subcommittee Legislative Activities—Continued	
3.7—Subcommittee on International Scientific Cooperation—Continued	
3.7(c)—Hearings to Examine U.S.-Soviet Science and Technology Exchanges	188
3.7(d)—Hearing on Global Prospects for U.S. Coal and Coal Technologies	189
3.7(e)—Global Climate Change	189
3.7(f)—U.S.-Latin American Cooperation in Science and Technology	190
3.7(g)—OTA Magnetic Fusion Report "Starpower"	191
3.7(h)—Hearing on Monitoring Technology Flow: Science, Technology and Trade Policy Implications	191
3.7(i)—Science, Technology, and American Diplomacy	192
3.7(j)—Subcommittee Meeting with Western European Union (WEU)	193
3.7(k)—U.S.-Poland Interparliamentary Exchanges on Science and Technology	193
3.7(l)—U.S.-Canada Interparliamentary Exchange	194
3.7(m)—European Oversight Trip	194
3.7(n)—International Cooperation on the Superconducting Super Collider	195
3.7(o)—Competitive Implications of Toxicological Standards and the Need for Consistent International Standards	196
3.7(p)—Sharing Foreign Technology: Should We Pick Their Brains?	196
3.7(q)—Science and the Summit	197
3.7(r)—Hearing on U.S./Japan Science and Technology Agreement	197
3.8—Subcommittee on Transportation, Aviation and Materials	198
3.8(a)—Railroad Technology	198
3.8(b)—National Critical Materials Council	199
3.8(c)—Progress in Aviation Weather Prediction and Reporting	200
3.8(d)—Civil Applications of the Tilt Rotor	201
3.8(e)—Roles and Mission of the Civil Aeromedical Institute (CAMI)	201
3.8(f)—Bureau of Mines	202
3.8(g)—National Aerospaceplane Program	202
3.8(h)—Department of Energy Authorizations (H.R. 2368 and H.R. 2369) (Transportation Programs)	203
3.8(i)—Bureau of Mines	204
3.8(j)—FAA R&D Program Review, NAS Plan, CAMI Mission and Program Plan	204
3.8(k)—National Critical Materials Council	205
3.8(l)—R&D on Pollution from Trucks and Buses	206
3.8(m)—The Medical Mission of the FAA	206
3.8(n)—Oversight of Computer Security act of 1987 (P.L. 100-235)	207

APPENDIXES

Publications of the Committee on Science, Space, and Technology, 100th Congress	209
Members of the Committee on Science, Space, and Technology: Individual Data (100th Congress)	217
Committee Membership (85th Congress through 99th Congress)	219
Public Laws (100th Congress), which were available at the time of publication.	230

SUMMARY OF ACTIVITIES—COMMITTEE ON SCIENCE,
SPACE, AND TECHNOLOGY

DECEMBER 19, 1988.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. ROE, from the Committee on Science, Space, and Technology
submitted the following

R E P O R T

HISTORY OF THE COMMITTEE ON SCIENCE, SPACE, AND
TECHNOLOGY

The Committee on Science, Space, and Technology has its roots in the intense reaction to the Soviet launch of Sputnik on October 4, 1957. Early in 1958 Speaker Sam Rayburn convened the House of Representatives, and the first order of the day was a resolution offered by Majority Leader John McCormack of Massachusetts. It read, "Resolved that there is hereby created a Select Committee on Astronautics and Space Exploration . . ."

The Select Committee performed its tasks with both speed and skill by writing the Space Act creating the National Aeronautics and Space Administration and chartering the permanent House Committee on Science and Astronautics, now known as the Committee on Science, Space, and Technology, with a jurisdiction comprising both science and space.

The Science and Astronautics Committee became the first standing committee to be established in the House of Representatives since 1946. It was also the first time since 1892 that the House and Senate had acted to create standing committees in an entirely new area.

The committee officially came into being on January 3, 1959, and on its 20th Anniversary the Honorable Charles Mosher said, the committee "was born of an extraordinary House-Senate joint leadership initiative, a determination to maintain American preeminence in science and technology, . . ."

The formal jurisdiction of the Committee on Science and Astronautics included outer space, both exploration and control, astronautical research and development, scientific research and development, science scholarships, and legislation relating to scientific agencies, especially the National Bureau of Standards, the National Aeronautics and Space Administration, the National Aeronautics and Space Council and the National Science Foundation.

The committee retained this jurisdiction from 1959 until the end of the 93rd Congress in 1974. While the committee's original emphasis in 1959 was almost exclusively astronautics, over this 15-year period the emphasis and workload expanded to encompass scientific research and development in general.

In 1974, a Select Committee on Committees, after extensive study, recommended several changes to the organization of the House in H. Res. 988, including expanding the jurisdiction of the Committee on Science and Astronautics, and changing its name to the Committee on Science and Technology.

To the general realm of scientific research and development was added energy, environmental, atmospheric, and civil aviation R&D. In addition, the new committee was given jurisdiction over the National Weather Service.

In addition to these legislative functions, the Committee on Science and Technology was assigned a "special oversight" function, giving it the exclusive responsibility among all Congressional standing committees to review and study, on a continuing basis, all laws, programs and government activities involving Federal non-military research and development.

In 1977, with the abolition of the Joint Committee on Atomic Energy, the committee was further assigned jurisdiction over civilian nuclear research and development thereby mounting out its jurisdiction for all civilian energy R&D.

A committee's jurisdiction gives it both a mandate and a focus. It is, however, the committee's chairman that gives it a unique character. The Committee on Science and Technology has had the good fortune to have five very talented and distinctly different chairmen, each very creative in his own way in directing the committee's activities.

Congressman Overton Brooks was the Science and Astronautics Committee's first chairman, and was a tireless worker on the committee's behalf for the two and one-half years he served as chairman.

When Brooks convened the first meeting of the new committee in January of 1959, committee Member Ken Hechler recalled, "There was a sense of destiny, a tingle of realization that every member was embarking on a voyage of discovery, to learn about the unknown, to point powerful telescopes toward the cosmos and unlock secrets of the universe, and to take part in a great experiment." With that spirit the committee began its work.

Brooks worked to develop closer ties between the Congress and the scientific community. On February 2, 1959, opening the first official hearing of the new committee Chairman Brooks said, "Although perhaps the principal focus of the hearings for the next several days will be on astronautics, it is important to recognize that this committee is concerned with scientific research across the

board." And so, from the beginning, the committee was concerned with the scope of its vision.

Overton Brooks died of a heart attack in September of 1961, and the chairmanship of the committee was assumed by Congressman George Miller of California.

Miller, a civil engineer, was unique among Members of Congress who rarely come to the legislature with a technical or scientific background. He had a deep interest in science, and his influence was clearly apparent in the broadening of the charter of the National Science Foundation and the establishment of the Office of Technology Assessment. He pioneered in building strong relationships with leaders of science in other nations. This work developed the focus for a new subcommittee established during his chairmanship, known as the Subcommittee on Science, Research and Development.

Just a few months before Miller became Chairman, President John F. Kennedy announced to a joint session of Congress the national commitment to land a man on the moon and return him safely to Earth before the end of the decade. Thus, during Miller's 11-year tenure as chairman, the committee directed its main efforts toward the development of the space program.

Chairman Miller was not reelected in the election of 1972, so in January of 1973, Olin E. Teague of Texas took over the helm of the committee. Teague, a man of directness and determination, was a highly decorated hero of the second World War. He was a long-standing Member of Congress and Chairman of the Veterans Committee before taking over the chairmanship of the Science and Technology Committee.

Throughout the 1960's and early 1970's, Teague chaired the Science Committee's Manned Space Flight Subcommittee, and in that capacity firmly directed the efforts to send a man to the moon.

As chairman of the committee, Teague placed heavy emphasis on educating the Congress and the public on the practical value of space. He also prodded NASA to focus on the industrial and human applications of the space program.

One of Teague's first decisions as chairman was to set up a subcommittee on energy. During his six-year leadership of the committee, energy research and development became a major part of the committee's responsibilities.

In 1976, Chairman Teague saw the fruition of three years of intensive committee work to establish a permanent presence for science in the White House. The Office of Science and Technology Policy was established with a Director who would also serve as the President's Science Advisor.

Throughout his leadership, he voiced constant concern that the complicated technical issues the committee considered be expressed in clear and simple terms so that Members of Congress, as well as the general public, would understand the issues.

After six years as Chairman, Teague retired from the committee and the Congress due to serious health problems. He was succeeded by Don Fuqua, a representative from northern Florida.

Fuqua became Chairman on January 24, 1979, at the beginning of the 96th Congress and was the youngest Member to succeed to the committee's chairmanship.

Don Fuqua came to the Congress after two terms in the Florida State Legislature and was, at age 29, the youngest Democrat in Congress when he was elected in 1962.

Fuqua's experience on the committee dated back to the first day of his Congressional service. Since 1963, he had served as a Member of the Committee's Manned Space Flight Subcommittee. When Olin Teague became chairman of the committee in 1973, Fuqua took Teague's place as chairman of the subcommittee.

As the subcommittee chairman he was responsible for major development decisions on the Space Shuttle and the successful Apollo-Soyuz link-up in space between American astronauts and Soviet cosmonauts. Later, the subcommittee's responsibility was expanded to cover all other NASA activities and was renamed the Subcommittee on Space Science and Applications.

As Chairman of the committee, Fuqua's leadership could be seen in the expansion of committee activities to include technological innovation, science and math education, materials policy, robotics, technical manpower, and nuclear waste disposal. He worked to strengthen the committee's ties with the scientific and technical communities to assure that the committee was kept abreast of current developments, and could better plan for the future.

During the 99th Congress, the Science and Technology Committee, under Fuqua's chairmanship, carried out two activities of special note.

The first was the initiation of a study of the nation's science policy encompassing the 40-year period between the end of the second World War and the present. The intent was to identify strengths and weaknesses in our nation's science network. At the end of the 99th Congress, Chairman Fuqua issued a personal compilation of essays and recommendations on American science and science policy issues in the form of a Chairman's Report.

The second activity was a direct outgrowth of the Space Shuttle "Challenger" accident of January 28, 1986. As part of the committee's jurisdictional responsibility over all the NASA programs and policies, a steering group of committee Members, headed by Congressman Robert Roe, the ranking Majority Member, conducted an intensive investigation of the Shuttle accident. The committee's purpose and responsibility were not only the specific concern for safe and effective functioning of the Space Shuttle program, but the larger objective of insuring that NASA, as the nation's civilian space agency, maintain organizational and programmatic excellence across the board.

Chairman Fuqua announced his retirement from the House of Representatives at the termination of the 99th Congress. He served 24 years on the Committee on Science and Technology and 8 years as its chairman.

Congressman Robert A. Roe of New Jersey, a long-time Member of the Committee, became its new Chairman at the beginning of the 100th Congress. With this fifth Chairman, the Committee was once again presided over by an individual with professional technical expertise. Congressman Roe was trained as an engineer and brought that broad knowledge and understanding to bear on the Committee's issues from the first day of his tenure.

Congressman Roe's first official act as Chairman was to request a change in the Committee's name from the Committee on Science and Technology to the Committee on Science, Space, and Technology. This change was designed not only to reflect the Committee's broad space jurisdiction, but also to convey the importance of space exploration and development to the Nation's future.

In the 100th Congress, under Chairman Roe's stewardship, the Committee kept close scrutiny over NASA's efforts to redesign and reestablish the Space Shuttle program. The successful launch of the Shuttle Discovery in September, 1988 marked America's return to space after 32 months without launch capability.

Both the vulnerability of having the nation's launch capability concentrated singularly in the Space Shuttle, and the rapid increase of foreign competition in commercial space activities, precipitated strong Committee action to help ensure the competitive posture of the nation's emerging commercial launch industry.

Chairman Roe's leadership to stabilize and direct the nation's space program led to the Committee's first phase of multi-year authorizations for research and development programs with the advent of 3 year funding levels for the Space Station.

Within the national movement to improve America's technological competitiveness, Chairman Roe headed the Committee's initiative to expand and redefine the mission of the National Bureau of Standards¹ in order for it to aid American industry in meeting global technological challenges.

The Science Committee has a long tradition of alerting the Congress and the nation to new scientific and technological opportunities that have potential to create dramatic economic or societal change. Among these have been recombinant DNA research and supercomputer technology. In the 100th Congress, Members of the Committee included the new breakthroughs in superconductivity research in this category.

¹ Now named the National Institute of Standards and Technology (NIST) (P.L. 100-48, Title V, Part B, Subpart A, Sections 5111 through 5163, enacted August 23, 1988.)

COMMITTEE MEMBERSHIP, 100TH CONGRESS, 1987-1988

ROBERT A. ROE, New Jersey, *Chairman*

GEORGE E. BROWN, Jr., California

JAMES H. SCHEUER, New York

MARILYN LLOYD, Tennessee

DOUG WALGREN, Pennsylvania

DAN GLICKMAN, Kansas

HAROLD L. VOLKMER, Missouri

HOWARD WOLPE, Michigan*

BILL NELSON, Florida

RALPH M. HALL, Texas

DAVE McCURDY, Oklahoma

NORMAN Y. MINETA, California

BUDDY MacKAY, Florida

TIM VALENTINE, North Carolina

ROBERT G. TORRICELLI, New Jersey

RICK BOUCHER, Virginia

TERRY BRUCE, Illinois

RICHARD H. STALLINGS, Idaho

JAMES A. TRAFICANT, Jr., Ohio

JIM CHAPMAN, Texas

LEE H. HAMILTON, Indiana

HENRY J. NOWAK, New York

CARL C. PERKINS, Kentucky

TOM McMILLEN, Maryland

DAVID E. PRICE, North Carolina

DAVID R. NAGLE, Iowa

JIMMY HAYES, Louisiana

DAVID E. SKAGGS, Colorado

PAUL E. KANJORSKI, Pennsylvania

GEORGE J. HOCHBRUECKNER, New York

MANUEL LUJAN, Jr., New Mexico RRM

ROBERT S. WALKER, Pennsylvania

F. JAMES SENSENBRENNER, Jr.,

Wisconsin

CLAUDINE SCHNEIDER, Rhode Island

SHERWOOD L. BOEHLERT, New York

TOM LEWIS, Florida

DON RITTER, Pennsylvania

SID MORRISON, Washington

RON PACKARD, California

ROBERT C. SMITH, New Hampshire

PAUL B. HENRY, Michigan

HARRIS W. FAWELL, Illinois

D. FRENCH SLAUGHTER, Jr., Virginia

LAMAR SMITH, Texas

ERNEST L. KONNYU, California

JACK BUECHNER, Missouri

JOEL HEFLEY, Colorado

CONSTANCE A. MORELLA, Maryland

CHRISTOPHER SHAYS, Connecticut

*Serving on the Committee on the Budget, 100th Congress.

HISTORY OF APPOINTMENTS

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

ONE-HUNDREDTH CONGRESS

January 8, 1987 Robert A. Roe, New Jersey, was elected Chairman of the Committee on Science, Space, and Technology, by the adoption of H. Res. 39.

The following Members were elected to the Committee by H. Res. 54, adopted January 22, 1987: George E. Brown, Jr., California; James H. Scheuer, New York; Marilyn Lloyd, Tennessee; Doug Walgren, Pennsylvania; Dan Glickman, Kansas; Harold L. Volkmer, Missouri; Bill Nelson, Florida; Ralph M. Hall, Texas; Dave McCurdy, Oklahoma; Norman Y. Mineta, California; Buddy MacKay, Florida; Tim Valentine, North Carolina; Robert G. Torricelli, New Jersey; Rick Boucher, Virginia; Terry L. Bruce, Illinois; Richard H. Stallings, Idaho; Bart Gordon, Tennessee; James A. Traficant, Jr., Ohio; Jim Chapman, Texas; Lee H. Hamilton, Indiana; Henry J. Nowak, New York; Carl C. Perkins, Kentucky; C. Thomas McMillen, Maryland; David E. Price, North Carolina; David R. Nagle, Iowa; and Jimmy Hayes, Louisiana.

The following Members were elected to the Committee by H. Res. 45, adopted January 21, 1987: Manuel Lujan, Jr., New Mexico; Robert S. Walker, Pennsylvania; F. James Sensenbrenner, Jr., Wisconsin; Claudine Schneider, Rhode Island; Sherwood L. Boehlert, New York; Tom Lewis, Florida; Don Ritter, Pennsylvania; Sid Morrison, Washington; Ron Packard, California; Robert C. Smith, New Hampshire; Paul B. Henry, Michigan; Harris W. Fawell, Illinois; D. French Slaughter, Jr., Virginia; Lamar Smith, Texas; Ernest L. Konnyu, California; Jack Buechner, Missouri; Joel Hefley, Colorado; and Constance A. Morella, Maryland.

Bart Gordon, Tennessee, resigned February 19, 1987, H. Res. 89.

David E. Skaggs, Colorado, elected March 30, 1987, H. Res. 133.

Christopher Shays, Connecticut, elected November 4, 1987, H. Res. 304.

Paul E. Kanjorski, Pennsylvania, and George J. Hochbrueckner, New York, elected Dec. 15, 1987, H. Res. 332.

LEGISLATIVE AND OVERSIGHT JURISDICTION OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

"RULE X. ESTABLISHMENT AND JURISDICTION OF STANDING COMMITTEES

"The Committees and Their Jurisdiction

"1. There shall be in the House the following standing committees, each of which shall have the jurisdiction and related functions assigned to it by this clause and clauses 2, 3, and 4; and all bills, resolutions, and other matters relating to subjects within the jurisdiction of any standing committee as listed in this clause shall (in accordance with and subject to clause 5) be referred to such committees, as follows:

* * * * *

"(r) Committee on Science, Space, and Technology.

"(1) Astronautical research and development, including resources, personnel, equipment, and facilities.

"(2) Bureau of Standards, standardization of weights and measurements and the metric system.

"(3) National Aeronautics and Space Administration.

"(4) National Aeronautics and Space Council.

"(5) National Science Foundation.

"(6) Outer space, including exploration and control thereof.

"(7) Science scholarships.

"(8) Scientific research and development, and demonstration, and projects therefor, and all federally owned or operated nonmilitary energy laboratories.

"(9) Civil aviation research and development.

"(10) Environmental research and development.

"(11) All energy research, development, and demonstration, and projects therefor, and all federally owned or operated nonmilitary energy laboratories.

"(12) National Weather Service.

"In addition to its legislative jurisdiction under the proceeding provisions of this paragraph (and its general oversight function under clause 2(b)(1)), the committee shall have the special oversight functions provided for in clause 3(f) with respect to all nonmilitary research and development.

* * * * *

"SPECIAL OVERSIGHT FUNCTIONS

"3. (f) The Committee on Science, Space, and Technology shall have the function of reviewing and studying, on a continuing basis, all laws, programs, and Government activities dealing with or involving nonmilitary research and development."

100TH CONGRESS
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEES AND THEIR JURISDICTIONS

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

ROBERT A. ROE, New Jersey, *Chairman*

HAROLD L. VOLKMER, Missouri
DAVID E. PRICE, North Carolina
GEORGE E. BROWN, JR., California
JAMES A. TRAFICANT, Jr., Ohio
(Vacancy)

DON RITTER, *Pennsylvania*
F. JAMES SENSENBRENNER, JR.,
Wisconsin
RON PACKARD, California
ERNEST L. KONNYU, California

Review and study, on a continuing basis, of the application, administration, execution, and effectiveness of those laws, or parts of laws, the subject matter of which is within the jurisdiction of the committee on and the organization and operation of the Federal and private agencies and entities having responsibilities in or for the administration and execution thereof, in order to determine whether such laws and the programs thereunder are being implemented and carried out in accordance with the intent of Congress. In addition, the Subcommittee on Investigations and Oversight and the appropriate subcommittee with legislative authority may cooperatively review and study any conditions or circumstances which indicate the necessity or desirability of enacting new or additional legislation within the jurisdiction of the committee, and may undertake futures research and forecasting on matters within the jurisdiction of the committee. The Subcommittee on Investigations and Oversight shall in no way limit the responsibility of other subcommittees from carrying out their oversight responsibilities, nor shall any investigation be undertaken by the Subcommittee on Investigations and Oversight without (a) consultation with the Chairman of the appropriate subcommittee with legislative authority and (b) approval of the Chairman of the subcommittee.

SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND
ENVIRONMENT

JAMES H. SCHEUER, New York, *Chairman*

TIM VALENTINE, North Carolina
DAVE McCURDY, Oklahoma
HENRY J. NOWAK, New York
TOM McMILLEN, Maryland
GEORGE E. BROWN, JR., California
GEORGE J. HOCHBRUECKNER, New York

CLAUDINE SCHNEIDER, Rhode Island
ROBERT SMITH, New Hampshire
PAUL HENRY, Michigan
JOEL HEFLEY, Colorado

Legislation, general and special oversight and all other matters relating to natural resources, including, but not limited to, water research, and, to the extent appropriate, agriculture R&D and population; legislation, risk, assessment and other matters relating to environmental research and development generally—including, but not limited to, research and development activities of the Environmental Protection Agency; environmental health, safety, life sciences, pharmaceutical, medication, and biotechnology activities of Executive departments and agencies, as appropriate; the National Weather Service; operational and research and development activities related to the atmosphere (including meteorology, aeronomy, climate, weather modification); those ocean R&D activities related to the quality and management of the environment of the National Oceanic and Atmospheric Administration; and operations of earth observing systems (except for SARSAT).

SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

MARILYN LLOYD, Tennessee, *Chairman*

RICK BOUCHER, Virginia

TERRY L. BRUCE, Illinois

RICHARD H. STALLINGS, Idaho

DOUG WALGREN, Pennsylvania

TIM VALENTINE, North Carolina

JAMES A. TRAFICANT, Jr., Ohio

JIM CHAPMAN, Texas

PAUL E. KANJORSKI, Pennsylvania

GEORGE J. HOCHBRUECKNER, New York

SID MORRISON, Washington

HARRIS W. FAWELL, Illinois

LAMAR SMITH, Texas

ERNEST L. KONNYU, California

JOEL HEFLEY, Colorado

CHRISTOPHER SHAYS, Connecticut

Legislation, general and special oversight and all other matters relating to all energy R&D and projects therefor, all federally owned or operated nonmilitary energy laboratories; basic energy sciences; high energy and nuclear physics; policy and management programs of the Department of Energy; and uranium enrichment and waste management activities, as appropriate.

SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY

DOUG WALGREN, Pennsylvania, *Chairman*

BUDDY MACKAY, Florida

LEE H. HAMILTON, Indiana

HENRY J. NOWAK, New York

DAVID E. PRICE, North Carolina

GEORGE E. BROWN, Jr., California

NORMAN Y. MINETA, California

TERRY L. BRUCE, Illinois

CARL C. PERKINS, Kentucky

DAVID R. NAGLE, Iowa

JIMMY HAYES, Louisiana

TIM VALENTINE, North Carolina

JIM CHAPMAN, Texas

DAVID E. SKAGGS, Colorado

PAUL E. KANJORSKI, Pennsylvania

GEORGE J. HOCHBRUECKNER, New York

SHERWOOD L. BOEHLERT, New York

PAUL HENRY, Michigan

CLAUDINE SCHNEIDER, Rhode Island

DON RITTER, Pennsylvania

SID MORRISON, Washington

D. FRENCH SLAUGHTER, Jr., Virginia

LAMAR SMITH, Texas

JACK BUECHNER, Missouri

CONSTANCE A. MORELLA, Maryland

CHRISTOPHER SHAYS, Connecticut

Legislation, general and special oversight and all other matters relating to the National Science Foundation; the National Bureau of Standards; the Office of Science and Technology Policy; the Office of Technology Assessment; scientific research and development and applications; science policy; scientific resources (including manpower); science education; science information and information sciences; technology transfer; technology assessment; innovation and industrial R&D; productivity and competitiveness; standards (weights, measures, etc.); patent policies as they relate to Federal research and development programs; R&D involving governmental health, nutritional and handicapped programs; intergovernmental mechanisms for R&D; geographic distribution of Federal R&D; and tax policy and the effect on R&D.

SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS

BILL NELSON, Florida, *Chairman*

GEORGE E. BROWN, Jr., California
 HAROLD L. VOLKMER, Missouri
 NORMAN Y. MINETA, California
 ROBERT G. TORRICELLI, New Jersey
 JAMES A. TRAFICANT, Jr., Ohio
 JIM CHAPMAN, Texas
 CARL C. PERKINS, Kentucky
 TOM McMILLEN, Maryland
 DAVID R. NAGLE, Iowa
 JIMMY HAYES, Louisiana
 JAMES H. SCHEUER, New York
 RALPH M. HALL, Texas
 BUDDY MacKAY, Florida
 DAVID E. SKAGGS, Colorado

ROBERT S. WALKER, Pennsylvania
 RON PACKARD, California
 ROBERT SMITH, New Hampshire
 D. FRENCH SLAUGHTER, Jr., Virginia
 ERNEST L. KONNYU, California
 JACK BUECHNER, Missouri
 JOEL HEFLEY, Colorado
 CONSTANCE A. MORELLA, Maryland
 TOM LEWIS, Florida

Legislation, general and special oversight and all other matters relating to the National Aeronautics and Space Administration (except aeronautical research and technology); national programs of research and development in space exploration and control, space applications, space commercialization, space communications and related matters; and research and development of earth observing systems.

SUBCOMMITTEE ON INTERNATIONAL SCIENTIFIC COOPERATION

RALPH H. HALL, Texas, *Chairman*

MARILYN LLOYD, Tennessee
 BUDDY MacKAY, Florida
 ROBERT G. TORRICELLI, New Jersey
 RICHARD H. STALLINGS, Idaho
 JAMES H. SCHEUER, New York

F. JAMES SENSENBRENNER, Jr.,
 Wisconsin
 SHERWOOD L. BOEHLERT, New York
 RON PACKARD, California
 HARRIS W. FAWELL, Illinois

International scientific cooperation; international technology transfer; international cooperative R&D (including global change, space station, nuclear and non-nuclear energy, the superconducting super collider, and international cooperative funding therefor); international scientific and technological competitiveness; international information and communications policy (including scientific data banks, technical communication and translation, and SARSAT); resolutions of joint cooperation with other national parliamentary committees on science and technology; international trade policy and its effect on science and technology and on R&D; international agriculture research policy (including the international implications of genetic engineering); and international intellectual property rights.

SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS

DAVE McCURDY, Oklahoma, *Chairman*

DAN GLICKMAN, Kansas
 BILL NELSON, Florida
 TOM McMILLEN, Maryland
 JIMMY HAYES, Louisiana

TOM LEWIS, Florida
 ROBERT S. WALKER, Pennsylvania
 F. JAMES SENSENBRENNER, Jr.,
 Wisconsin

Legislation, general and oversight and all other matters relating to civil aviation research and development (includes aeronautical research and technology programs of the National Aeronautics and Space Administration and research and development programs of the Federal Aviation Administration); transportation programs of the Department of Energy; aviation-weather services; materials R&D and national materials policies, both domestic and international; oversight of surface transportation research and development programs of the Department of Transportation, Urban Mass Transportation Administration, Federal Railroad Administration, Federal Highway Administration, National Highway Traffic Safety Administration, and Coast Guard and the Maritime Administration; oversight of research and development in communications other than that for which the Subcommittee on Space Science and Applications is responsible.

TECHNOLOGY POLICY TASK FORCE (ESTABLISHED APRIL 23, 1987)

BUDDY MACKAY, Florida, *Chairman*

GEORGE E. BROWN, Jr., California
TOM McMILLEN, Maryland
DAVID E. PRICE, North Carolina
DAVID R. NAGLE, Iowa
JIMMY HAYES, Louisiana
DOUG WALGREN, Pennsylvania
TIM VALENTINE, North Carolina
DAVID E. SKAGGS, Colorado
NORMAN Y. MINETA, California

RON PACKARD, California
TOM LEWIS, Florida
PAUL HENRY, Michigan
CONSTANCE A. MORELLA, Maryland
CLAUDINE SCHNEIDER, Rhode Island
HARRIS W. FAWELL, Illinois

The Committee Chairman and Ranking Republican Member are Ex-Officio voting Members of each subcommittee and the Technology Policy Task Force.

CHAPTER I—LEGISLATIVE ACTIVITIES OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

During the 100th Congress, 166 bills were referred to the Committee on Science, Space, and Technology; several Committee measures were incorporated at the conference level of three comprehensive bills; 34 were reported to the House, and 25 were enacted.

1.1—PUBLIC LAW 100-107, MALCOLM BALDRIGE NATIONAL QUALITY IMPROVEMENT ACT OF 1987 (H.R. 812)

To amend the Stevenson-Wydler Technology Innovation Act of 1980 to establish the National Quality Award, with objective of encouraging American business and other organizations to practice effective quality control in the provision of their goods and services.

Summary and Background of Legislation

Until a few decades ago, the U.S. was a world leader in quality, and that leadership provided us with a broad market for our products, both domestically and overseas. In recent years, however, that leadership role has been challenged strongly by foreign competition and our Nation's productivity growth has fallen behind those of our competitors. American business is beginning to recognize the importance of commitment to excellence in manufacturing and services through strategic planning for quality and quality improvement programs. In an effort to regain the quality edge in many fields we have lost to Japan and several European nations, many experts have called for the creation of a national quality award to stimulate quality management in American industries. This legislation establishes an award similar to the Deming Prize awarded annually in Japan to the company which does the best job in quality throughout its organization. In recognition of former Secretary Malcolm Baldrige's important contributions to American industry and his personal interest in the drafting of this legislation, the national quality award has been named in his honor.

Public Law 100-107 amends the Stevenson-Wydler Technology Innovation Act of 1980 (Public Law 96-480) by adding a new section which establishes the Malcolm Baldrige National Quality Award. It directs the President or the Secretary of Commerce to make the award periodically to companies and other organizations which in the judgment of the President or Secretary have significantly benefited the economic or social well-being of the United States through improvements in the quality of their goods or services. The awards are to be made in the categories of business or their subsidiaries, service companies, and small businesses. No more than two awards may be given under any one category. The bill includes a provision describing the application, evaluation, and compliance require-

ments, along with the duties of the Director of the National Bureau of Standards¹ as the authorized overseer of the program. There are no appropriated Federal funds involved. The funding, including the administrative costs of running the awards program, is to come from private contributions, or if necessary, from the fees assessed on the organizations applying for the award. A report is required from the Secretary of Commerce to the President and the Congress after the program has been in effect for three years.

Legislative History

H.R. 812 was introduced on January 28, 1987 by Congressmen Walgren and Boehlert and referred to the Committee on Science, Space, and Technology. A hearing was held on March 4, 1987 by the Science, Research and Technology Subcommittee to consider the legislation. Based on recommendations received at the hearing, the Subcommittee drafted language changes which were incorporated into an amendment in the nature of a substitute, which was then reported by the Subcommittee on March 7, 1987. The bill was reported by the Committee on Science, Space, and Technology on May 13, 1987, with amendments. The legislative report (H. Rept. 100-96) was filed on May 18, 1987. H.R. 812 passed the House on June 8, 1987 under suspension of the rules and was referred to the Senate Commerce, Science and Transportation Committee. On July 28, 1987, the Senate Commerce, Science and Transportation Committee considered an amendment in the nature of a substitute to H.R. 812, which included provisions naming the legislation and the national quality award program in honor of Secretary Baldrige. The legislative report (S. Rept. 100-143) was filed on August 4, 1987. H.R. 812 passed the Senate on August 5, 1987, with an amendment in the nature of a substitute. On August 7, 1987, the House agreed to the amendment of the Senate, by unanimous consent, clearing the measure for the President. Public Law 100-107 was signed by the President on August 20, 1987. Committee Publication Numbers 100-5; H. Rept. 100-96.

1.2—PUBLIC LAW 100-147, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT OF 1988 (H.R. 2782, S. 1164)

To authorize appropriations to the National Aeronautics and Space Administration for research and development; space flight, control and data communications; construction of facilities; and research and program management; and for other purposes.

Summary and Background of Legislation

The Committee on Science, Space, and Technology is responsible for authorization of appropriations for the National Aeronautics and Space Administration programs. This jurisdiction is shared by two Subcommittees; Space Science and Applications for space programs; and Transportation, Aviation and Materials for aeronautical research and technology.

¹ Now named the National Institute of Standards and Technology (NIST) (P.L. 100-418, Title V, Part B, Subpart A, Sections 5111 through 5163, enacted August 23, 1988).

Space

Public Law 100-147 authorizes \$9,573,800,000 for space activities divided as follows: \$3,719,000,000 for research and development; \$4,045,300,000 for space flight control and data communications; \$216,500,000 for construction of facilities; and \$1,593,000,000 for research and program management.

The research and development account includes the following programs: Space Station; Space Transportation Capability Development; Physics and Astronomy; Life Sciences; Planetary Exploration; Space Applications; Technology Utilization; Commercial Use of Space; Space Research and Technology; and Tracking and Data Advanced Systems.

The authorization was \$64,800,000 more than than requested by NASA. NASA had submitted a request of \$9,481,000,000 for FY 1989 and later submitted a budget amendment request for an additional \$28,000,000 for expendable launch vehicles.

Funding for the Research and Development account was allocated in the following manner:

	<i>Million</i>
(1) Space Station.....	\$767,000
(2) Space Transportation Capability Development.....	553,600
(3) Physics and Astronomy.....	581,800
(4) Life Sciences.....	74,600
(5) Planetary Exploration.....	320,300
(6) Space Applications.....	651,400
(7) Technology Utilization.....	18,300
(8) Commercial Use of Space.....	30,700
(9) Aeronautical Research & Technology.....	387,000
(10) Transatmospheric Research & Technology.....	66,000
(11) Space Research and Technology.....	234,000
(12) Safety, Reliability and Quality Assurance.....	16,200
(13) Tracking and Data Advanced Systems.....	18,100

Funding for the Space Flight, Control, and Data Communications account was allocated in the following manner:

	<i>Billion</i>
(1) Space Shuttle Prod. & Capability Development.....	\$1,174,600
(2) Space Transportation Operations.....	1,885,800
(3) Expendable Launch Vehicle Operations.....	60,000
(4) Space & Ground Network, Com. & Data Systems.....	924,900

The Construction of Facilities account was authorized at \$216,500,000.

The Research and Program Management account was authorized at \$1,593,000,000.

The law provides long-term guidance concerning funding and operation of the Space Station, including limitations on annual costs of the Space Station to 25 percent of the total NASA budget request, and operations costs (excluding utilization) to 10 percent of the total NASA budget request. Other provisions require NASA to submit reports to Congress with recommendations on Space Station pricing policy, and a report on cost effective use of space transportation systems for launch of Space Station elements. Finally, the law requires NASA to submit to Congress for review the intergovernmental agreements and Memorandums of Understanding between the United States Government and Canada, Japan and

Europe concerning design, development, construction, operation, and utilization of the Space Station.

Sec. 115 of Title I authorizes the Administrator to accept gifts and donations for the construction of a Space Shuttle Orbiter. (This section reflects the intent of H.R. 173, a bill introduced by Mr. Lagomarsino and referred to the Subcommittee on February 2, 1987.)

Sec. 116 encourages the use of expendable launch vehicles in the Nation's civilian space flight program.

Sec. 117 of the law amends the Space Act to authorize NASA to enter into contracts for expendable launch vehicle services for periods beyond which funds are otherwise available for obligation.

Sec. 118 directs NASA to study and report on satellite servicing.

Sec. 119 directs NASA to review and report to Congress on the findings and recommendations of the National Commission on Space.

Sec. 120 expresses the sense of Congress that the Space Shuttle program would benefit competition and that an Advanced Solid Rocket Motor would enhance the capabilities of the Space Shuttle.

Sec. 121 further directs NASA to proceed with acquisition of an Advanced Solid Rocket Motor.

Title I also amends section 24 of the Commercial Space Act (49 U.S.C. App. 2623) and authorizes appropriations to the Department of Transportation Office of Commercial Space Transportation to fund the following: planning and development; licensing procedures, operations and enforcement risk management; hazards and environment; industry analysis and planning; administrative costs; and salaries and expenses.

Title II is cited as the National Space Grant College and Fellowship Act and incorporates language provided in H.R. 1633, introduced by Congressman Andrews and referred to the Subcommittee on March 23, 1987. The purpose of this title is to encourage the understanding, assessment, development and utilization of space resources.

Title III contains amendments to the Land Remote Sensing Commercialization Act of 1984.

Aeronautical Research and Technology

NASA requested \$375,000,000 for Aeronautical Research and Technology. This amount represented a \$1,000,000 decrease from the Fiscal Year 1987 appropriation. Furthermore, in constant 1988 dollars, it is about \$10,000,000 less than the amount actually spent in 1981.

The significance of the long-term trend is reflected in a worsening international trade picture for aerospace products, the largest component of which is civil aircraft and parts. During the 1980's, a serious foreign challenge to U.S. leadership emerged, resulting in a first-ever, downward trend in the aerospace balance of trade. Indicative of this pattern was a four-fold increase in European penetration of the large transport market within the United States itself, previously a virtual U.S. monopoly.

Thus, it is clear the United States must run harder if it wishes to remain competitive in the world aviation market, one of the few remaining sectors that still produces a net positive balance of trade.

Technology is an essential element of success in aviation, both civil and military. Breakthroughs in performance have always been the sought-after goal that could change the outcome in air warfare situations or commercial competitions. The United States is pre-eminent in both areas today largely because unheralded researchers in NASA and DOD laboratories, working with small amounts of money, have found those breakthroughs. Revolutionary advances such as the area rule for supersonic flight, the tilt rotor and the prop fan have profoundly changed aviation. Yet the basic work that led to the ideas was achieved at a very low cost.

The Committee felt the level of basic aeronautical research must be enhanced substantially if the trends in world aviation trade are to be reversed. Accordingly, it recommended a \$20,000,000 augmentation to the Research and Technology Base, to be applied to basic research in aerodynamics, propulsion, materials and structures, and controls and guidance. Within this amount, \$2,000,000 is earmarked for general aviation rotary engine research. The Committee is interested in recent advances in the two-stroke rotary vee engine and believes the engine may have the potential to provide greater power-to-weight efficiencies than conventional rotary engines. The Committee directed NASA to conduct a technical assessment of rotary vee engine performance and possible applications of high temperature ceramics to rotary vee engine design. The Committee recommended \$250,000 for rotary vee engine activities in FY 1988. In addition, \$2,000,000 was recommended to augment the High Angle of Attack System Technology Program and \$2,000,000 million to augment the engine hot section work under the Advanced High Temperature Engine Materials Systems Technology Program. The total recommended authorization was \$399,000,000.

Transatmospheric Research and Technology

NASA requested \$66,000,000 for Transatmospheric Research and Technology. This amount is NASA's contribution to a joint NASA/DOD research project to develop the technology for and prove the feasibility of an aerospace plane, capable of extended hypersonic cruise in the upper atmosphere or single-stage-to-orbit operation. The Committee recommended the request. Furthermore, the Committee recommended earmarking \$2,000,000 of the funds authorized to perform studies aimed at eventual civil applications.

Legislative History

H.R. 1741 was introduced on March 19, 1987 by Chairman Roe (by request, Executive Communication 938), and referred to the Committee on Science, Space, and Technology. On March 31, 1987, it was referred jointly to the Subcommittee on Space Science and Applications and the Subcommittee on Transportation, Aviation and Materials. On April 29, 1987, the Subcommittee on Transportation, Aviation and Materials marked up the Aeronautical section of the bill and ordered the bill forwarded, with amendments, to the Full Committee. On May 12, 1987, the Subcommittee on Space Science and Applications held its first markup on the bill. On June 24, 1987, the Subcommittee held a second markup and ordered a clean bill, incorporating actions of the Subcommittee on Transportation, Aviation and Materials and reflecting the recommendations

of the Subcommittee on Space Science and Applications, to be introduced for Committee consideration.

Prior to introduction of the NASA Authorization legislation, the Full Committee met on February 5, 1987, to conduct a posture hearing at which the Administrator of NASA testified in support of the proposed NASA budget. Additional hearings were held by the Subcommittee on Space Science and Applications on February 24, 25; March 3, 5, 10, 11, 18, 31; April 8; and May 6, 1987. The Subcommittee on Transportation Aviation and Materials held hearings on March 10, 1987, and jointly with the Subcommittee on Research and Development of the Committee on Armed Services on March 11, 1987.

On June 25, 1987, H.R. 2782 was introduced by Mr. Roe. The Full Committee met to markup the bill on June 26, 1987, and on that date, the Committee ordered the bill reported with an amendment. On July 7, 1987, the Committee report was filed in the House (H. Rept. 100-204). A hearing before the Committee on Rules took place on July 8, 1987, at which a one-hour, open rule was granted.

H.R. 2782 was considered by the House on July 9, 1987. The House agreed to the Committee amendment, as amended by the Mineta substitute amendment, that strikes language on the use of the Space Station; the Lujan amendment that directs NASA to review and report to Congress on a plan to ensure participation of qualified individuals from outside NASA and the military in filling mission specialist astronaut positions; the Torricelli amendment that clarifies provisions relating to procurement competition in the Space Shuttle Solid Rocket Motor program; the Traficant amendment that changes the percentage difference between bids submitted by foreign and domestic firms from 5 to 10 percent in language defining when the Administrator must award contracts to domestic firms; and the Smith of New Hampshire amendment that strikes language requiring that the positions of Administrator and Deputy Administrator not be occupied by retired commissioned officers of the Armed Forces unless a period of ten years has passed since active duty, agreed to by the roll call vote (No. 251) of 268 ayes to 135 nays. The amendment offered by Mr. Morrison of Connecticut that sought to set a cap on the total authorization at \$9.267 billion was rejected by the roll call vote of 148 ayes to 257 nays (No. 252).

On July 10, 1987, H.R. 2782 passed the Senate, after striking all after the enacting clause and inserting in lieu thereof the text of S. 1164, the Senate companion measure. On October 8, 1987, the House agreed to the amendment of the Senate with an amendment; clearing the measure for further Senate action. On October 13, 1987, the Senate concurred in the amendment of the House to the Senate amendment, clearing the measure for the President.

H.R. 2782 was signed by the President on October 30, 1987, becoming Public Law 100-147. Committee Publication Numbers 100-20, Volume I, 100-25 (TAM); 100-35, Volume II, 100-43, Volume III (SSA); H. Rept. 100-204.

1.3—PUBLIC LAW 100-203, THE OMNIBUS RECONCILIATION ACT (AS IT AMENDS THE NUCLEAR WASTE POLICY ACT OF 1982) (H.R. 3545)

To provide for reconciliation pursuant to section 4 of the concurrent resolution on the budget for fiscal year 1988.

The Omnibus Reconciliation Act of 1987 substantially amends the Nuclear Waste Policy Act of 1982 (Public Law 97-425) by narrowing nuclear waste repository siting efforts from three sites to one site, in Nevada; by authorizing a Monitored Retrievable Storage Facility (MRS); by authorizing a Federal negotiator to seek states or tribes to volunteer as a site for a repository or an MRS facility; and by authorizing incentive payments to any cooperating state or tribe. The reforms adopted by the Congress were consistent with the recommendations of the Committee's Subcommittee on Energy Research and Development in its markup of the proposed Department of Energy budget in March, 1987. Additionally, the incentive payment provisions are similar to the provisions adopted by the Committee in 1981 in the bill H.R. 5016, "To establish a Federal policy with respect to the disposal of high-level radioactive waste from civilian nuclear activities, to provide for the construction, operation, and maintenance of waste disposal facilities, to provide for a program of nuclear waste and spent fuel research and development, * * *", which led to the Nuclear Waste Policy Act of 1982.

Legislative History

On December 11, 1987, the House agreed to a conference on H.R. 3545 and on the 15th of December conferees were appointed from the Committee on Science, Space, and Technology, for consideration of section 2002 (insofar as that section would add new sections 403(i) and 410 to the Nuclear Waste Policy Act of 1982), 2006 and 2008 of the Senate amendment, and modifications committed to conference. The conference report was filed in the House and agreed to by the House on December 21, 1987 (H. Rept. 100-495). The Senate agreed to the conference report on December 22, 1987. H.R. 3545 was signed by the President on December 22, 1987, becoming Public Law 100-203.

1.4—PUBLIC LAW 100-204, FOREIGN RELATIONS AUTHORIZATION ACT, FISCAL YEARS 1988 AND 1989 (TITLE IX, SECTIONS 1101-1106) (H.R. 3497, H.R. 1777, S. 1394)

To authorize appropriations for fiscal years 1988 and 1989 for the Department of State, the United States Information Agency, the Voice of America, the Board for International Broadcasting, and for other purposes.

Summary and Background of Legislation

October 8, 1987, H.R. 1777, the Foreign Relations Authorization Act, Fiscal Years 1988 and 1989, passed the Senate containing the language of S. 1394, which in Title IV creates a Global Climate Task Force to determine and supervise the research necessary for a coordinated national strategy on global climate, to develop such a strategy, and to initiate implementation of such strategy domestically and internationally, essentially contains the provisions of H.R. 3497, a bill referred to the Committee on Science, Space, and

Technology. On the basis of this provision, the Committee requested that conferees be appointed to the conference on H.R. 1777, as amended, for consideration of the provisions of H.R. 3497 incorporated therein.

Members of the Committee participated as conferees on Title XI, Global Climate Protection, of the Senate-passed version of H.R. 1777. Title XI fosters development of policy responses to climate change by directing the President, through the Environmental Protection Agency, to propose to Congress a coordinated national policy on global climate change and by directing the Department of State to coordinate U.S. policy through the channels of multi-lateral discussions and negotiation. Title XI is meant to complement, rather than change, existing interagency and international arrangements for research on global climate change.

Legislative History

A conference report was filed in the House on December 14, 1987, (H. Rept. 100-475), incorporating as Title XI, sections 1101-1106, the provisions of the Global Climate Protection Act of 1987 (H.R. 3497). The provisions seek to research the problems of global warming (the greenhouse effect), climate change, and to promote, through the United Nations system, the designation of an International Year of Global Climate Protection. The conference report was approved by the House on December 15, 1987, and by the Senate on December 16, 1987. The measure was signed by the President on December 22, 1987, becoming Public Law 100-204.

1.5—PUBLIC LAW 100-223, AIRPORT AND AIRWAY SAFETY AND CAPACITY EXPANSION ACT OF 1987 (H.R. 2310, S. 1184, H.R. 1517)

To amend the Airport and Airway Improvement Act of 1982 for the purpose of extending the authorization of appropriations for airport and airway improvements, and for other purposes.

Summary and Background of Legislation

The Airport and Airway Improvement Act of 1982 ended its five-year authorization with Fiscal Year 1987. The Committee extended the authorization for a two-year period.

The FAA requested a total of \$150,000,000 for Research, Engineering and Development for Fiscal Years 1988 and 1989. The Committee felt these requests were inadequate to the task at hand and recommended an authorization of \$201,005,000 for Fiscal Year 1988 and \$215,000,000 for Fiscal Year 1989.

The major portion of the FAA's requested funds are for front-end development costs to support the National Airspace System (NAS) Plan which began in 1982 as a response to H.Res. 202, to develop and implement a long-range program to modernize and increase the capacity and reliability of the enroute and terminal Air Traffic Control (ATC) system through advanced technology. The bulk of the NAS Plan has passed the research and technology development stage and is beyond the Committee's jurisdiction except for a sustaining effort for the plan that is reflected in the Administration's request.

The \$150,000,000 annual levels for 1988 and 1989 are only about 70% of previous forecasts of the need for these years. In spite of an increasing unspent balance in the Trust Fund (some \$9 billion), budgetary constraints of the last several years have caused the postponement or elimination of many advanced concept studies. This year's request further delays several advanced research needs. The Committee felt that to abandon the advanced research necessary to sustain the growth afforded by the NAS plan and for the requirements of the post-NAS-Plan period would be tantamount to legislating a future crisis in the ability of the ATC system to meet 21st century requirements.

The Committee recommended an augmentation of \$51.005 million, to be applied as follows: (1) separation standards, advanced navigation, user preferred trajectories, dynamic use airspace, oceanic traffic management, low-altitude surveillance, NAS development studies, advanced concepts, AERA 3, advanced traffic management systems, terminal ATC automation, automatic dependent surveillance [\$9.244 million]; (2) beacon surveillance enhancements [\$2.7 million]; (3) communications data link, rotorcraft communications, future communications regulation and architecture, VSCS [\$13.872 million]; (4) airport safety support, planning, all-weather taxi guidance, surface visual control, aircraft takeoff/landing advances [\$1.5 million]; (5) flight service station enhancements [\$0.6 million]; (6) terminal tower control experimentation and development [\$1.6 million]; (7) controller human factors, satellite technology, voice data entry, CADM flow management and ATC techniques, advanced wind shear sensor development [\$5.056 million]; (8) rotorcraft support, SBIR [\$3.646 million]; (9) navigation systems engineering, utilization of civil GPS, helicopter IFR operational evaluation, navigation enhancements [\$2.4 million]; (10) flight crew human factors, precision approach engineering [\$0.758 million]; (11) weather research, centralized Wx information processing, low level wind shear detection, advanced weather devices and sensors, weather sensor enhancements [\$3.251 million]; (12) aviation medicine R&D [\$2.015 million]; (13) cabin fire safety, regulatory support, propulsion, transport/helicopter crashworthiness, flight safety [\$3.550 million]. Of the amount added for Aircraft Safety (\$3.55 million), \$1.2 million is authorized for increased research in fire safety studies. The increase in research is being directed toward studies of new fire resistant materials used in aircraft interiors and for studies to reduce the toxicity of smoke resulting from interior aircraft fires; (14) environment and noise reduction [\$0.813 million].

The total authorization for Fiscal Year 1988 is \$201,005,000; for Fiscal Year 1989, \$215,000,000.

Legislative History

H.R. 2310 was introduced May 7, 1987 and jointly referred to the Committee on Public Works and Transportation, and Committee on Science, Space, and Technology. The Science, Space, and Technology Committee, on May 8, 1987, referred the bill to the Subcommittee on Transportation, Aviation and Materials (TAM).

On March 24, 25, and April 23, 1987, the TAM Subcommittee held hearings on the FAA's FY 1988 Research, Engineering and Development budget request. On April 29, 1987, TAM, considered,

marked up and forwarded the bill, amended, to the Full Committee. On May 20, 1987, the Full Committee conducted markup, amended, and ordered the bill reported. The bill was reported from the Science, Space, and Technology Committee to the House, amended, June 3, 1987 (H. Rept. 100-123, Part I), reported from the Public Works and Transportation Committee on June 26, 1987 (H. Rept. 123, Part II), and placed on the Union Calendar.

The Ways and Means Committee reported an amendment (at the request of the Public Works and Transportation Committee) to add a tax title to the bill, requesting the Rules Committee to make the amendment in order as original text for House Floor consideration (Committee on Ways and Means Print 100-21). The Rules Committee reported a Rule making in order the text of H.R. 3350 as an original bill for the purpose of amendment (H. Res. 275), which was defeated in the House on September 30, 1987, by the roll call vote of 178 ayes to 235 nays. The Rules Committee reported another Rule (H. Res. 278), making H.R. 3350 in order for purposes of amendment by the House. H. Res. 278 was agreed to by the roll call vote of 368 ayes to 42 nays on October 1, 1987. H.R. 2310 passed the House, amended, on October 1, 1987, by the roll call vote of 396 ayes to 0 nays.

In the Senate, H.R. 2310 was ordered placed on the calendar October 6, 1987; it passed the Senate, amended (the text of S. 1184, the Senate companion measure), October 28, 1987; the Senate asked for a Conference October 28, 1987, House agreed to a Conference November 20, 1987. The conference report was filed in the House December 15, 1987 (Rept. 100-484). The Senate agreed to the conference report December 17; the House agreed to the conference report December 18, 1987 (roll call 410 yeas, 1 nay), clearing the measure for the President. The measure was signed by the President December 30, 1987, becoming Public Law 100-223. Committee Publication Numbers 100-6; H. Rept. 100-123, Part 1.

Incorporated into Public Law 100-223, Title II, Section 203, as a Senate amendment to H.R. 2310, was identical language contained in H.R. 1517, the Aircraft Collision Avoidance Act of 1987, as passed by the House on November 3, 1987. The history of H.R. 1517 follows.

AIRCRAFT COLLISION AVOIDANCE ACT OF 1987 (H.R. 1517)

To amend the Federal Aviation Act of 1958 to require the installation and use of collision avoidance systems in aircraft, to require the Federal Aviation Administration to complete research on the development of the TCAS-III (Traffic Alert and Collision Avoidance System) as soon as possible, and for other purposes.

Summary and Background of Legislation

A number of airline accidents in recent years clearly demonstrate the need for collision avoidance systems. An FAA analysis of these accidents concluded that if airline aircraft had been equipped with TCAS-III, the accidents could have been prevented. The dramatic increase in near-misses, as reported by the National Trans-

portation Safety Board, also indicate the need for collision avoidance systems.

The bill directed the Federal Aviation Administration to develop and implement an 18-month schedule to complete certification and operational approval of TCAS-II. During the 18 months, the FAA is to report to Congress monthly on its progress toward certification.

Also during the 18 months, the FAA is directed to develop regulations to require the installation of TCAS-II, within 30 months from certification, on all aircraft with more than 30 seats. These two requirements should mean that the entire airline fleet operating within the United States airspace should have TCAS-II on board within four years, or by late 1991.

The bill requires the Federal Aviation Administration to complete certification of TCAS-III as soon as possible, and authorizes appropriations from the Airport and Airway Trust Fund to carry out this effort. The Federal Aviation Administration is directed to ensure that TCAS-II is designed to be readily modified to incorporate subsequent TCAS-II technology.

The bill directs the FAA to issue regulations to require that all aircraft operating in high density traffic areas be equipped with Mode-C transponders. Widespread use of Mode-C altitude reporting transponders by aircraft operation in areas of high air traffic density is key to TCAS's effectiveness.

The expanded use of Mode-C will enhance the effectiveness of the TCAS approach to collision avoidance. The Committee believes that increasing the number of aircraft with Mode-C has safety benefits aside from TCAS. Mode-C enables air traffic controllers to do their jobs more effectively because of the enhanced radar image as well as the identification and altitude information provided.

The Committee also recognizes that the FAA, from time to time, has allowed for certain glider, helicopter, balloon, agricultural, or other specialized aircraft operations to be exempt from the altitude encoding requirements of terminal control areas, provided such operations do not adversely impact on aviation safety. The Committee believes the FAA should continue to exercise the flexibility under the bill.

Legislative History

H.R. 1517 was introduced March 10, 1987 by Mr. Packard and jointly referred to the Committees on Public Works and Transportation, and Science, Space, and Technology. The Science, Space, and Technology Committee, on March 16, 1987, referred the bill to the Subcommittee on Transportation, Aviation and Materials (TAM).

On August 7, 1987, the Committee on Public Works and Transportation reported the bill, amended, to the House (H. Rept. 100-286, Part I).

On September 9, 1987, the TAM Subcommittee conducted a hearing to examine the status of the FAA's collision avoidance R&D programs, as well as procedural changes proposed by the FAA to reduce the threat of mid-air collisions. On that date, also, the TAM Subcommittee conducted markup and forwarded the bill to the Full Committee. On September 29, 1987, the Committee on Science, Space, and Technology conducted markup, and ordered the bill re-

ported, amended. The bill was reported to the House, amended, October 6, 1987 (H. Rept. 100-286, Part II) and placed on the Union Calendar. On November 3, 1987, the bill was called up by the House under Suspension of the Rules and passed by a yea-nay vote of 405-4.

On November 4, 1987, the bill was referred to the Senate Committee on Commerce, Science, and Transportation. On December 15, 1987, the provisions of H.R. 1517 became section 203 of the Senate amendment to H.R. 2310 (H. Rept. 100-484), which was signed into law on December 30, 1987, becoming Public Law 100-223. Committee Publication Numbers 100-67; H. Rept. 100-286, Part II.

1.6—PUBLIC LAW 100-235, THE COMPUTER SECURITY ACT OF 1987 (H.R. 145)

To provide for a computer standards program within the National Bureau of Standards, to provide for government-wide computer security, and to provide for the training in security matters of persons who are involved in the management, operation, and use of Federal computer systems, and for other purposes.

Summary and Background of Legislation

As the role of the Federal Government has become broader, automation and the need to secure data has grown. Within the Federal Government, several agencies have been charged with the responsibility for establishing computer security controls and standards. The mixture of laws, regulations and responsible agencies created overlapping and duplication of effort in some areas, and lacked coordination in others.

During the 99th Congress, the Subcommittee on Transportation, Aviation and Materials and Subcommittee on Science, Research and Technology, held hearings and Federal computer and communications privacy and security (TAM hearings: September 14, 1984, June 27, 1985, October 29, 1985; TAM joint with SRT: October 30, 1985). Witnesses expressed strong support for the concept of a greater central focus in the government for guidance in protecting systems.

H.R. 2889, the Computer Security Act of 1985, was introduced by Mr. Glickman on June 27, 1985, to amend the Act establishing the National Bureau of Standards to provide for a computer security research program within such Bureau, and to provide for the training of Federal employees who are involved in the management, operation, and use of automated information processing systems. The bill was referred to the Committee on Government Operations, and the Committee on Science and Technology. The Government Operations Committee completed markup on October 29, 1985, making substantial changes in the scope of the bill. The Science and Technology Committee, on July 9, 1985, referred the bill to the Subcommittee on Transportation, Aviation and Materials (TAM); and the Subcommittee on Science, Research and Technology (SRT). The TAM and SRT Subcommittees held a joint hearing on October 30, 1985. TAM considered and marked up the bill on November 14, 1985, and forwarded the bill, amended, to the Full Committee. SRT

considered and marked up the bill on November 21, 1985 and forwarded the bill, amended, to the Full Committee. On June 4, 1986, the Committee on Science and Technology conducted markup, amended, and ordered the bill reported. The bill was reported to the House, amended, August 6, 1986 by the Science and Technology Committee (H. Rept. 99-753, Part I) and by the Government Operations Committee (Part II). On August 12, 1986, the bill was called up by the House under suspension of the rules. The bill failed passage under suspension of the Rules on August 13, 1986. On August 15, 1986, the Rules Committee held a hearing and reported H. Res. 537, granting a one-hour, open rule. No further action was taken on H.R. 2889 during the remainder of the 99th Congress.

At the beginning of the 100th Congress, H.R. 145 was introduced, based largely on H.R. 2889 from the 99th Congress, which would require the National Bureau of Standards² (NBS) to establish a computer security standards program for Federal computer systems. The bill directs NBS to develop government-wide standards and guidelines, training programs, and validation standards to evaluate the effectiveness of computer security standards; and to work with the National Security Agency (NSA) and other agencies in developing these standards and guidelines and conducting research and studies. Based on recommendations submitted by the NBS, the Secretary of Commerce would be required to promulgate standards and guidelines for computer security. The bill would also establish a 13-member Computer System Security and privacy Advisory Board composed of representatives of other federal agencies and the private sector.

Within six months of the date of enactment, H.R. 145 would require all federal agencies to identify each computer system that contains sensitive data. Each agency would be required to establish a plan for the security of each computer and related system previously identified within a year after the date of enactment, and to revise it annually as necessary. The bill also requires mandatory periodic training in computer security for all federal agency employees who manage, use or operate computer systems. Each federal agency would also be required to provide for similar training for certain employees of private contractors and other organizations, such as state and local governments, that process information on behalf of the federal government.

Legislative History

H.R. 145 was introduced January 6, 1987 by Mr. Glickman and 7 cosponsors. The bill was jointly referred to the Committee on Government Operations, and Committee on Science, Space, and Technology. The Science, Space, and Technology Committee, on February 5, 1987, referred the bill to the Subcommittee on Transportation, Aviation and Materials, and the Subcommittee on Science, Research, and Technology.

On February 26, 1987, the Subcommittee on Transportation, Aviation and Materials, and the Subcommittee on Science, Research and Technology, held a joint hearing on H.R. 145 to supple-

² Now named the National Institute of Standards and Technology (NIST) (P.L. 100-418, Title V, Part B, Subpart A, Sections 5111 through 5163, enacted August 23, 1988).

ment the substantive legislative record created from last year's Committee hearings by inviting spokesmen of companies and industry groups who made public their views on computer security after last year's record was closed.

On May 19, 1987, the Subcommittee on Transportation, Aviation and Materials held an additional hearing to touch upon four major issues: (1) the current state of computer security in the Federal Government; (2) the role of the National Security Agency in setting Federal computer security standards; (3) the issue of privacy and security, particularly with a new "sensitive but unclassified" criteria; and (4) the role of the Federal Government in adequately training Federal employees and heightening awareness of computer security.

The Committee on Government Operations, on April 7, 1987, marked up and ordered reported the bill, amended; reporting it to the House on June 11, 1987 (H. Rept. 100-153, Part II).

SRT considered and marked up the bill on April 9, 1987, and forwarded the bill, amended, to the Full Committee. TAM considered and marked up the bill on April 29, 1987, using as a markup vehicle the bill reported by the Subcommittee on Science, Research and Technology (which was essentially identical to the bill reported by the Government Operations Committee). No amendments were adopted by the TAM Subcommittee. On May 20, 1987, the Committee on Science, Space, and Technology conducted markup, amended, and ordered the bill reported. The bill was reported to the House, amended, June 11, 1987 (H. Rept. 100-153, Part I), and placed on the Union Calendar.

On June 22, 1987, the bill, as amended, was called up by the House under suspension of the Rules and passed by a voice vote.

On December 21, 1987, H.R. 145 passed the Senate, without amendment, by voice vote, and was cleared for the President. The measure was signed by the President on January 8, 1988, becoming Public Law 100-235. Committee Publication Numbers 100-8; 100-15; H. Rept. 100-153, Part I.

1.7—PUBLIC LAW 100-252, THE EARTHQUAKE HAZARDS REDUCTION ACT ON 1977 REAUTHORIZATION (H.R. 1612)

To authorize appropriations under the Earthquake Hazards Reduction Act of 1977 for Fiscal Years 1988, 1989 and 1990, and for other purposes.

Summary and Background of Legislation

H.R. 1612 authorizes appropriations to carry out the Earthquake Hazards Reduction Act of 1977 for fiscal years 1988 (\$73,078,000), 1989 (\$79,766,000), and 1990 (\$85,060,000).

All or part of 39 States are located in regions classed as having major or moderate seismic risk. Within these States, more than 70 million people are exposed to the earthquake hazards of ground shaking, surface faulting, earthquake ground failure and tsunamis. In response to the need to reduce the damage done by earthquakes, the Congress enacted the Earthquake Hazards Reduction Program (NEHRP), a multiagency effort to meet the congressionally mandated objectives. The agencies involved are: Federal Emergency

Management Agency (FEMA); U.S. Geological Survey (USGS); National Science Foundation (NSF); and National Bureau of Standards³ (NBS). The National Earthquake Hazards Reduction Program is working to reduce the risks from future earthquakes in the United States.

Legislative History

The Subcommittee on Science, Research and Technology held a hearing on the Earthquake Hazards Reduction Act on March 10, 1987, with witnesses from the Federal Government, California Seismic Safety Commission, Utah Geological and Mineral Survey, Massachusetts Office of Emergency Preparedness, and the National Center for Earthquake Engineering, State University of New York at Buffalo.

On March 17, 1987, the Subcommittee met to mark up H.R. 1612, which had been introduced by Mr. Roe (by request; Administration Proposal 100-835) on March 16, 1987. The bill was jointly referred to the Committees on Science, Space, and Technology and Interior and Insular Affairs. During the Subcommittee markup, an amendment was accepted to reestablish the Federal Emergency Management Agency's cost-sharing program for state and local assistance at the fiscal year 1987 appropriation level thus authorizing the FEMA program at \$5.778 million, rather than the Administration's request of \$5.313 million. FEMA's budget request for fiscal year 1988 reflected a reduction of \$465,000 from the FY 1987 level to correspond with an OMB directive. The amendment also provided a 0.17 percent inflationary increase in fiscal year 1989, identical to the percentage increase in the Administration proposal. This amendment would overturn an Office of Management and Budget directive for FEMA to require states to match grants (50/50) for emergency preparedness and planning commencing in fiscal year 1988. The Subcommittee accepted another amendment which would forbid the imposition of new cost-sharing requirements in fiscal year 1988. Now, only three states engage in any cost sharing with FEMA. The amendment, however, would allow FEMA to require up to a 25 percent match in fiscal year 1989.

Another amendment dealt with the USGS's earthquake program. The Administration request of \$32.540 million reduced two programs—regional seismic networks that measure quake activity in California, Alaska, Washington, Nevada, Utah, and Missouri and elsewhere; and geodetic surveys that measure the build up of tension in some earthquake-prone regions.

The Subcommittee adopted an amendment to increase the USGS's earthquake budget to the level required to maintain programs at the fiscal year 1986 post Gramm-Rudman-Hollings level, raising the USGS authorization from the Administration request of \$32.540 million to \$36.540 million. The additional funding above the Administration's fiscal year 1988 request would cover the cost of increased salaries and retirement benefits, as well as the full cost of operating the fiscal year 1987 programs in fiscal year 1988. The amendment would also provide a 3.5 percent inflationary in-

³ Now named the National Institute of Standards and Technology (NIST) (P.L. 100-418, Title V, Part B, Subpart A, Sections 5111 through 5163, enacted August 23, 1988).

crease in fiscal year 1989, identical to the percentage increase in the Administration proposal.

By unanimous voice vote, the Subcommittee ordered H.R. 1612 forwarded to the Committee on Science, Space, and Technology with amendments. On May 13, 1987, the Committee adopted an additional amendment to reduce the NSF earthquake budget for fiscal year 1988 by \$465,000 to \$28.235 million and by \$466,000 in fiscal year 1989 to \$31.634 million. By unanimous voice vote, the Committee ordered H.R. 1612 reported with amendments for a fiscal year 1988 authorization total of \$71.078 million as follows: FEMA—\$5.778 million; USGS—\$36.540 million; NSF—\$28.235 million; and NBS—\$525,000. For fiscal year 1989, the authorization total of \$75.766 million is as follows: FEMA—\$5.788 million; USGS—\$37.819 million; NSF—\$31.634 million; and NBS—\$525,000. (H. Rept. 100-89, Part 2)

The Committee on Interior and Insular Affairs ordered H.R. 1612 reported, as amended by voice vote on April 22, 1987 (H.Rept. 100-89, Part 1). H.R. 1612, as reported by the Interior Committee, contained two major differences from H.R. 1612, as reported by the Science, Space, and Technology Committee: the bill provided a four-year authorization and authorized the President's request for the NSF earthquake budget in the amounts of \$28.700 million for FY 1988 and \$32.100 million for FY 1989.

On June 8, 1987, the House suspended the Rules, and passed an agreement reached between the Interior and Insular Affairs Committee and the Science, Space, and Technology Committee. The agreement contained the following: a three-year authorization; retention of the Science Committee's authorization levels for fiscal year 1988 and fiscal year 1989; and for fiscal year 1990, an increase at the same percentage as the President's fiscal year 1989 request for each agency, for a total authorization of \$80,919,000.

On June 9, 1987, the bill was received in the Senate and referred to the Committee on Commerce, Science, and Transportation. The Committee ordered the measure favorably reported on July 28, 1987, with an amendment in the nature of a substitute. The bill, as reported by the Senate Commerce, Science, and Transportation Committee, authorized a total of \$75.543 million in fiscal year 1988 and a total of \$80.232 million in fiscal year 1989 distributed as follows: FEMA—\$5.778 million for fiscal year 1988 and \$5.788 million for fiscal year 1989; USGS—\$40.450 million for fiscal year 1988 and \$41.819 million for fiscal year 1989; NSF—\$28.700 million for fiscal year 1988 and \$32.100 million for fiscal year 1989; and NBS—\$525,000 for fiscal year 1988 and \$525,000 for fiscal year 1989 (S. Rept. 100-239).

On December 21, 1987, the Senate, by unanimous consent, accepted an amendment in the nature of a substitute to H.R. 1612. The amendment passed by the Senate reflected a compromise reached among the Senate Committee on Commerce, Science, and Transportation and the House Committees on Science, Space, and Technology and Interior and Insular Affairs. As passed, H.R. 1612 authorized a total of \$73.078 million in fiscal year 1988, \$79.766 million in fiscal year 1989, and \$85.060 million in fiscal year 1990. In addition, the bill retained the House provision to restore the state and local assistance program at FEMA, which would have

been cut in half by the Administration's request; maintained the House provision to reduce slightly the Administration's proposed earthquake research budget for the National Science Foundation in fiscal years 1988-1990; retained the Senate's provision to increase the USGS's program in fiscal year 1988 by \$2.0 million to fund the study of earthquakes in the eastern United States and to support university research in the field of engineering seismology (support for both initiatives was doubled in fiscal year 1989 and increased by 3.5 percent in fiscal year 1990); and accepted the Senate version of the provision, similar to that of the House, that prohibited FEMA from requiring a 50/50 cost sharing match for states participating in FEMA's state and local assistance program until 1989. All other provisions are identical to provisions in the House-passed bill. On February 16, 1988 the Rules were suspended and the House concurred in the amendment of the Senate, clearing the measure for the President. H.R. 1612 was signed by the President on February 29, 1988, becoming Public Law 100-252. Committee Publication Numbers 100-14; H. Rept. 100-89, Part 2.

1.8—PUBLIC LAW 100-408, THE PRICE-ANDERSON AMENDMENTS ACT OF 1987 (H.R. 1414)

To amend the Price-Anderson provisions of the Atomic Energy Act of 1954 to extend and improve the procedures for liability and indemnification for nuclear incidents.

Background and Summary of Legislation

P.L. 100-408 amends the provisions of the Price-Anderson Act, section 170 of the Atomic Energy Act of 1954, to extend and improve procedures to provide for public liability due to nuclear activity by a licensee of the Nuclear Regulatory Commission (NRC) or a Department of Energy (DOE) contractor or some other entity specified in the legislation that deals with nuclear materials. The two major objectives of the Act as passed in September 1957 were; (1) to assure the availability of funds in the event of a nuclear incident; and, (2) to remove the growth deterrent for the nuclear power industry presented by the threat of unlimited liability claims in the event of a nuclear incident. The Price-Anderson Act has been amended twice since 1957. Key elements of the Act, including the section of the Act which authorized DOE to give its contractors indemnity for nuclear activities, expired on August 1, 1987.

The major provisions of P.L. 100-408 raise the ceiling on public liability for a nuclear incident to an amount equal to approximately \$7 billion (the exact amount is dependent upon the number of reactors in the insurance pool and the maximum amount of private insurance available); waive State statute of limitation laws if a lawsuit alleging liability is filed within three years of the date the claimant knew or reasonably could have known of the injury; broadens the definition of "extraordinary" nuclear occurrence; provides for public liability due to a nuclear incident outside the United States, underground detonation activities, and nuclear waste; and, sets forth new procedures for lawsuits following a nuclear incident.

The Committee on Science, Space, and Technology exercised jurisdiction over that portion of the law dealing with DOE contractors and others who own or operate research and development reactors. P.L. 100-408, in addition to the provisions noted, would extend DOE's indemnification authority for 15 years; make indemnification mandatory for all DOE contractors that could incur public liability for nuclear activity; provide indemnification for nuclear waste handled by DOE through its contractors; require that DOE (and not NRC) be the sole agency to provide coverage under the Act to its demonstration reactors; and, allow DOE to indemnify its contractors for administrative and legal costs incurred under the Act.

Legislative History

P.L. 100-408 was introduced as H.R. 1414 on March 4, 1987, and referred to the Committee on Interior and Insular Affairs. It was reported with amendments from the Interior Committee on May 21, 1987, and sequentially referred to the Committee on Science, Space, and Technology, and Energy and Commerce. The Committee on Science, Space and Technology, Subcommittee on Energy Research and Development, held a hearing on the bill on June 17, 1987, and a markup on June 24, 1987. The Committee considered H.R. 1414 on July 22, 1987, and ordered it reported with amendments. The Legislative Report was filed in the House on July 22, 1987 (H. Rept. 100-104, Part 2). The measure passed the House, amended, on July 20, 1987 (roll call vote of 396 ayes to 17 nays). On July 31, 1987, it was received in the Senate and placed on the Senate calendar. On March 18, 1988, the bill with amendments passed the Senate (recorded vote of 46-44). On August 2, and August 5, 1988 the House and then the Senate accepted a compromise version and presented it to the President on August 11, 1988. P.L. 100-408 was signed by the President on August 20, 1988. Committee Publication Numbers 100-30; H. Rept. 100-104, Part 2.

1.9—PUBLIC LAW 100-418, THE OMNIBUS TRADE AND COMPETITIVENESS ACT OF 1988 (H.R. 4848; H.R. 3)

To enhance the competitiveness of American industry, and for other purposes.

Background

The current trade imbalance has been one of the most important problems facing the United States for the past several years. Trade policy by its very nature cuts across the jurisdiction of most of the Committees of the House of Representatives. Therefore, when the Congress made the commitment to address the U.S. trade problems through major legislation, it did so both in the House and in the Senate by combining bills produced by various committees of the Congress into a unified piece of legislation. The Committee on Science, Space, and Technology wrote two bills, H.R. 2160 and H.R. 2916, which were incorporated into H.R. 4848, Title V, Subtitle B, Part I entitled the Technology Competitiveness Act.

Subpart A of the Technology Competitiveness Act renames the National Bureau of Standards (NBS) as the National Institute of

Standards and Technology (NIST). It updates the 1901 NBS Organic Act to include explicit authority for NIST to conduct all standards work currently underway or needed in the foreseeable future. An organization plan for NIST is to be submitted to Congress within 120 days of enactment and 60 days before implementation.

Under Subpart B, NIST is authorized to establish Regional Centers for the Transfer of Manufacturing Technology (Regional Centers) to provide outlets for the demonstration of NIST technology to small and medium-sized firms. Initially the Regional Centers will be focused on automated manufacturing. For FY 1989 and 1990 a total of \$40,000,000 is authorized for these programs. The Secretary of Commerce is to conduct a study of existing state technology extension services and their relation to the Federal Government and develop an implementation plan for NIST assistance to state technology programs. Two million (per year) is authorized for three years beginning in FY 1989, for cooperative agreements with states, after which the program sunsets. The NBS Energy-Related Inventions Program is extended to permit evaluation and technical support for all worthy inventions. A Clearinghouse of State and Local Initiatives is established in the Commerce Department's Office of Productivity, Technology, and Innovation to collect and disseminate information on federal, state and local initiatives promoting technology innovation.

Subpart C establishes an Advanced Technology Program to serve as a focal point for cooperation between the public and private sector in the development of advanced industrial technology. The NBS visiting Committee is broadened to a Visiting Committee on Advanced Technology to provide outside expert advice on all programs of NIST.

In Subpart D, a National Advisory Committee on Semiconductors is established with the mandate to recommend a national strategy to ensure U.S. competitiveness in the semiconductor industry. A National Commission on Superconductivity is established to review major policy issued related to superconductor research.

In Subpart E, NBS authorization for appropriations are included for traditional NBS programs at the same level as in the FY 1988 appropriations bill, H.R. 2160.

In Subpart F, small corrections are made to the Federal Technology Transfer Act of 1986. Miscellaneous provisions a ban on NIST research associate fees, reestablishment of the Department of Commerce Science and Technology Fellowship Program, and limits on the ability of the Department of Commerce to contract out functions of the National Technical Information Service. The Metric Conversion Act of 1975 is amended to establish metric as the preferred system of measurement in federal procurements, grants, and business related activities. This provision is patterned after DOD Directive Number 4120.18, which established this policy in the Department of Defense.

Part II, entitled Symmetrical Access to Technological Research, directs the President to include information describing foreign access to research and development opportunities in the U.S. in the annual report to Congress mandated by Title V of the Foreign Relation Authorization Act of 1979.

Part III amends the National Critical Materials Act to establish a National Federal Program Plan for advanced materials and recognizes the role of the Critical Materials Council.

Subtitle C, the Competitiveness Policy Council Act, establishes the Competitiveness Policy Council in the Executive Office of the President to provide advice on long-term competitiveness strategies and to create consensus in favor of these strategies. Membership is to be broad-based and to include business, government, labor, academia, and public interest groups.

Subtitle D requires the Office of Management and Budget in the President's annual budget submission to assess the impact of the federal budget on the U.S. trade balance and other important economic indicators. Part II of the subtitle requires the heads of each Federal department and agency to include in reports or comments on proposed legislation a detailed statement of the legislation's impact on the U.S. trade position and the ability of U.S. firms to compete in foreign or domestic markets. Part II also requires reports on the progress of SEMATECH in meeting its goals in meeting civilian semiconductor research needs. The reports shall enumerate the long and short range civilian technology goals of SEMATECH, describe how the program is designed to meet these goals, and report on annual progress of each component of the SEMATECH project.

Title VI, Subtitle E establishes the National Science Foundation Academic Research Facilities Modernization and Instrumentation Modernization Programs. This new authority was further modified in the National Science Foundation Authorization Act for FY 1989, P.L. 100-570. See Section 1.13 of this Summary of Activities.

Title VIII includes the requirement for the General Accounting Office to make recommendations to Congress concerning the desirability of extending the Small Business Innovation Research (SBIR) Program to more agencies to make its percentage share of agency research and development budgets larger and to make the program permanent.

Legislative History

This Act began as H.R. 3 in the House of Representatives. Various Committees held hearings on the bill during February and March of 1987. Floor consideration occurred from April 28 to April 30, 1987 with final passage occurring on April 30, 1987. The Senate wrote its own bill which matched H.R. 3 only in part. The Senate version passed the Senate under the number H.R. 3 on July 21, 1987 and conferees were initially appointed August 7, 1987. The conference lasted for eight months. The conference report (H. Rept. 100-576) was agreed to on April 21, 1988 in the House of Representatives and on April 27, 1988 in the Senate. H.R. 3 was vetoed May 24, 1988 by President Reagan. While the House of Representatives passed the bill over the Presidential veto on May 24, 1988, the Senate sustained the Presidential veto by a three vote margin on June 8, 1988. Almost immediately H.R. 4848, was introduced June 16, 1988, containing almost the exact text of H.R. 3, with the exception of changes in two provisions not within the jurisdiction of the Committee on Science, Space, and Technology. H.R. 4848 passed

the House of Representatives on July 13, 1988, and the Senate on August 3, 1988, as introduced. It was signed into law as P.L. 100-418 on August 23, 1988.

The Committee on Science, Space, and Technology chose not to include a title in H.R. 3 as originally reported in the U.S. House of Representatives, but to join the legislative process later. The Committee wrote and reported the bills H.R. 2160, the National Bureau of Standards Authorization Act for FY 1988 and H.R. 2916, the Technology Competitiveness Act. (See Chapter II.) The Senate Committee on Commerce, Science, and Transportation reported a companion bill S. 907, also called the Technology Competitiveness Act, which contained all of the parallel provisions to all of the two House bills' except for the metric provisions, and had the text of S. 907 as reported from Committee added to the text of the Senate trade bill as introduced. Senator Pell offered a metric amendment which was added to the trade bill on the floor of the Senate.

The facilities section, Title VI, was the culmination of an effort that began with the introduction by Former Committee Chairman Fuqua of H.R. 2823, the University Research Facilities Act of 1985, in the 99th Congress. That bill would have required each major federal research agency to set aside 10 percent of its funds for facilities grants. The bill was not reported out of any Committee. During the 99th Congress, a facilities provision was also included in the Trade Bill, H.R. 4800. That provision, by Mr. Jeffords, would have created a grant program in the Department of Education. The bill was not taken up by the Senate.

In the 100th Congress, Mr. Roe introduced H.R. 1905, the University Research Facilities Act of 1987, which would have created a grant program in the National Science Foundation (NSF). Mr. Jeffords again offered his Trade Bill provision, which became part of the Education and Labor sections of H.R. 3. The Science, Space, and Technology Committee was involved, through the good offices of the Education and Labor Committee, on those sections since the Senate Labor and Human Resources Committee rejected the proposal to have a facilities program in the Department of Education and instead, proposed a program in NSF. The conference version of H.R. 3 did create a facilities program in NSF with an authorization for fiscal year 1988. The provision was carried over in H.R. 4848, which on August 23, 1988 was signed into law as P.L. 100-418.

A similar provision was also included in H.R. 4418, the National Science Foundation Authorization Act for Fiscal Years 1989 and 1990, as reported from the Committee, with authorizations for fiscal years 1989 and 1990. That provision was then altered by H.R. 4418, as amended by the Senate. A compromise provision was then adopted by the House on September 26, 1988, and agreed to by the Senate on October 14, 1988, and signed by the President on October 31, 1988 (P.L. 100-570). Public Law 100-570 repealed the facilities section of Public Law 100-418.

When conferees were appointed in the U.S. House of Representatives, only the Committee on Science, Space, and Technology members were appointed as conferees on the Technology title (Title V, Subtitle B, Section 5111-5164 of P.L. 100-418) which contained all the provisions described before. Additionally, Science Committee Members were the sole conferees on amendments to the Critical

Materials Act (Sections 5181-5184), and lead conferees on the provisions dealing with Symmetrical Access to Technology Research (Section 5171). Science Committee Members were appointed as additional conferees on provisions dealing with SEMATECH (Section 5422) and semiconductor research (Section 5142), monitoring of technology transfers, the small business innovation research program, the council on Industrial Competitiveness, and a variety of studies. The Committee also worked with the Committee on Education and Labor regarding the role of the National Science Foundation in the Research Facilities Modernization and Instrumentation Modernization Programs (Sections 6401-6403).

1.10—PUBLIC LAW 100-441, THE CONTINENTAL SCIENTIFIC DRILLING AND EXPLORATION ACT (H.R. 2737/S. 52)

To direct the Secretary of the Department of Energy, the Secretary of the Department of the Interior through the United States Geological Survey, and the Director of the National Science Foundation to implement the national Continental Scientific Drilling Program.

Summary and Background of Legislation

During the past 10 years, members of the geological scientific community have rallied support for establishing a Continental Scientific Drilling Program (CSDP). The impetus for a national program originated from a series of scientific symposia and National Academy of Sciences reports, as well as significant investments made by Russia and West Germany in similar programs. Currently, our knowledge of the Earth's crust is restricted to scientific drilling of the ocean floor and industrial continental drilling undertaken to search for commercial resources. These drilling sites sample only small and limited sections of the extremely varied crust of the earth.

The supporters of the CSDP believe that, by studying the vast amounts of unexplored continental crust, scientists will gain insights into dynamic earth processes, such as earthquakes and volcanic eruptions. Furthermore, the basic knowledge derived from this package is expected to enhance: commercial and economic opportunities in the areas of fossil fuel and mineral discovery; utilization of geothermal energy; and drilling technologies.

In an attempt to coordinate previously independent geological drilling programs, the Department of Energy, the Department of Interior, and the National Science Foundation signed an accord in 1984 which establishes a cooperative effort among these agencies. The accord defines the framework for an Interagency Coordinating Group (ICG) as a mechanism for cooperation and coordination of the agencies' programs. In 1984 a Congressional resolution that expressed support for a United States continental scientific drilling program was signed into law (P.L. 98-473).

Although the agencies agreed to coordinate and cooperate on their research activities, some critics believe that the present CSDP remains too diffuse to achieve efficient and timely results. These critics contend that a long-range plan with focus and established

priorities is required for the United States to be successful in this endeavor.

Public Law 100-441 directs the Secretary of the Department of Energy, the Secretary of the Department of the Interior through the United States Geological Survey, and the Director of the National Science Foundation to implement the policies of P.L. 98-473 (CSDP) and to ensure the effective functioning of the ICG. The ICG remains the principal entity for coordinating the efforts of the Federal agencies in achieving the objectives of the CSDP. Public Law 100-441 also requires the ICG to submit a report to Congress on the objectives and priorities of the CSDP, including proposed schedules of desirable scientific and engineering events, funding requirements for each participating Federal agency in fiscal year 1989, and anticipated benefits of the program. Further, annual updates of funding requirements for each participating Federal agency are required to be submitted to Congress.

Legislative History

H.R. 2737 was introduced by Miss Schneider, Mr. Lujan, Jr., and Mr. Brown of California on June 22, 1987, and referred jointly to the Committees on Science, Space, and Technology, and Interior and Insular Affairs. On November 3, 1987, the Subcommittee on Science, Research and Technology held a joint hearing on H.R. 2737 with the Subcommittee on Mining and Natural Resources of the Committee on Interior and Insular Affairs. The hearing focused on the cooperation of the Federal agencies charged with implementation of the present Continental Scientific Drilling Program, the goals and anticipated benefits of the program, as well as the need for a legislative mandate to ensure interagency coordination and an effective national program. Witnesses representing the Federal agencies, universities, national laboratories, and industry included: Dr. Donald K. Stevens, Associate Director, Office of Energy Sciences, Department of Energy; Dr. Dallas Peck, Director., USGS; Dr. Ian MacGregor, Division Director for Earth Sciences, NSF; Dr. C. Barry Raleigh, Director of Lamont-Doherty Geological Observatory, Columbia University; Dr. John Hermance, Professor of Geological Sciences, Brown University; Dr. Carol Otte, President of UNOCAL Geothermal Division, UNOCAL Corp.; and Dr. Robert Schock, Lawrence Livermore National Laboratory.

Based on recommendations received at the hearing, the Subcommittee amended the reporting requirements in H.R. 2737 to limit the initial resource estimate of the Federal agencies to fiscal year 1989, to require annual updates for the funding estimates, and to require only a single funding estimate for each agency. The Subcommittee reported the bill on April 14, 1988. The Committee reported the bill with amendments on April 21, 1988, and the legislative report (H. Rept. 100-580, Part 2) was filed on May 2, 1988. The Committee on Interior and Insular Affairs reported the bill with identical amendments on April 20, 1988, and filed the legislative report (H. Rept. 100-580, Part 1) on April 26, 1988.

S. 52, a bill identical to H.R. 2737, was introduced in the Senate by Senator Pressler on June 1, 1987. It was subsequently passed by voice vote on June 17, 1987. A very similar bill, S. 1026, was passed

by the Senate in the 99th Congress, 2nd session. A hearing on S. 1026 was held on July 24, 1986 (Senate Hearing 99-902).

H.R. 2737, as amended, passed the House on May 23, 1988, under suspension of the Rules. S. 52 was then taken from the Speaker's table, amended by substituting the provisions of H.R. 2737 as passed by the House for the text of S. 52, and then passed by voice vote.

S. 52, as amended by the House, was agreed to by the Senate with a technical amendment on June 10, 1988. The House agreed to the technical amendment of the Senate by unanimous consent on September 9, 1988. Public Law 100-441 was signed by the President on September 22, 1988. Committee Publication Numbers 100-45; H. Rept. 100-580, Part 2.

1.11—PUBLIC LAW 100-476, THE FEDERAL FIRE PREVENTION AND CONTROL ACT AUTHORIZATION FOR FISCAL YEARS 1989, 1990, AND 1991 (H.R. 4419)

To authorize appropriations for activities under the Federal Fire Prevention and Control Act of 1974.

Background and Summary of Legislation

P.L. 100-476 authorizes a total of \$17,039,000 for fiscal year 1989, \$17,737,000 for fiscal year 1990, and \$18,464,000 for fiscal year 1991.

The Act rejects the Administration's fiscal year 1989 proposals to eliminate all fire prevention and arson control activities (\$3,145,000) and four positions and to reduce by 66 percent, funding for the firefighter travel stipend program (\$822,000). The programs are funded at the fiscal year 1988 appropriation level (which is below the fiscal year 1988 authorization) plus a 4.1 percent increase for inflation and an annual 4.1 percent inflationary increase for fiscal year 1990 and fiscal year 1991. In addition, the bill limits funds that can be used as site administration for the National Emergency Training Center to no more than \$4,150,000, which represents 60 percent of the total expenditures for site administration. The cap on site administration would allow for a more equitable distribution of costs among various funding sources and programs of FEMA and other agencies that use the National Emergency Training Center facility.

Legislative History

The Subcommittee on Science, Research and Technology held a hearing on the fiscal year 1989 authorization for the Federal Fire Prevention and Control Act on March 10, 1988. Testimony on the funding levels and program direction for the U.S. Fire Administration (USFA) and the National Fire Academy (NFA) was given by federal representatives and top service leaders.

On April 14, 1988, the Subcommittee on Science, Research and Technology met to mark up a Subcommittee draft bill. By unanimous voice vote the Subcommittee accepted the draft bill with an amendment and ordered a bill reflecting the Subcommittee's actions to be prepared for introduction in the House. The amendment reduced the site administration cap from \$4,572,000 to \$4,150,000. As a result of recommendations received at the hearings, and the

subsequent Subcommittee markup, H.R. 4419, reflecting the recommendations of the Subcommittee, was introduced on April 20, 1988 by Mr. Walgren. The Committee considered H.R. 4419 on April 21, 1988, and ordered it reported, without amendment.

The legislative report was filed in the House on April 27, 1988. H.R. 4419 passed the House under suspension of the Rules on May 24, 1988. In the Senate, the bill was referred to the Committee on Commerce, Science, and Transportation, which reported H.R. 4419 on July 27, 1988 (S. Rept. 100-435).

On August 10, 1988, the Senate passed H.R. 4419, after adopting an amendment thereto. The House on September 26, 1988, concurred in the amendment to H.R. 4419, clearing the measure for the President. Public Law 100-476 was signed by the President on October 6, 1988. Committee Publication Numbers 100-98; H. Rept. 100-589.

1.12—PUBLIC LAW 100-519, THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY AUTHORIZATION ACT FOR FY 1989 (H.R. 4417)

To authorize appropriations to the Secretary of Commerce for the programs of the National Institute of Standards and Technology for Fiscal Year 1989, and for other purposes.

Background and Summary of Legislation

For fiscal year 1989, P.L. 100-519 authorizes \$158,039,000 for the National Institute of Standards and Technology (NIST), formerly the National Bureau of Standards (NBS); \$1,000,000 for a newly established Technology Administration managed by an Under Secretary of Commerce for Technology; \$2,000,000 for the Office of Technology policy, which replaces the Office of Productivity, Technology, and Innovation (OPTI); and \$1,000,000 to continue the activities authorized in the Japanese Technical Literature Act of 1986. The bill also provides for the modernization of and limits efforts to privatize the National Technical Information Service (NTIS). The law, as enacted, reflects the new name and responsibilities of the former NBS as mandated by P.L. 100-418, the Omnibus Trade and Competitiveness Act of 1988. The funding level for NIST is \$158,039,000, the same level as requested by the Administration.

The total includes all the research initiatives proposed by the Administration, including process and quality control; bioprocess engineering; lightwave metrology; high performance composites; and superconductivity, although in certain instances not at Administration request levels. The Act also restores funding for the fire and building safety programs. Although the Administration requested \$4,000,000 for a Thomas A. Edison Technological Innovation Award, the provision was not incorporated in H.R. 4417, as reported, by the Committee.

\$3,000,000 is included for NIST to carry out its responsibilities under the Computer Security Act of 1987 (P.L. 100-235); \$3,300,000 is authorized for new technology programs; and \$6,500,000 is authorized for the Cold Neutron Source Facility. The bill also includes exclusive authorization amounts of \$2,000,000 for steel technology; \$4,000,000 for the Center for Building Technology;

\$6,000,000 for the Center for Fire Research; and \$7,500,000 for the Technical Competence Fund.

H.R. 4417 as reported from the Committee would have authorized \$168,500,000 for the National Bureau of Standards, now NIST, and converted the National Technical Information Service into a government corporation called the National Technical Information Corporation. H.R. 4417 as passed by the Congress reflects changes worked out after consulting with the Committees on Energy and Commerce, and the Judiciary.

The Act also authorizes \$2.0 million for the Office of Technology Policy, which supersedes the Office of Productivity, Technology and Innovations; \$1.0 million for the Technology Administration; and \$1.0 million for the Office of Japanese Technical Literature, which will become a part of the National Technical Information Service. The Committee continues to believe in the importance of these programs to the overall competitiveness effort and will continue to support them.

Legislative History

The Subcommittee on Science, Research and Technology held authorization hearings on March 15, 16, and 17, 1988 on the proposed FY 1989 budget for NBS (renamed NIST), OPTI, and NTIS, as well as the Administration's proposed plan to privatize NTIS.

As a result of recommendations received at the hearings and Subcommittee markup on April 19, 1988, a substitute amendment was drafted for Committee consideration. On May 5, 1988, the Committee on Science, Space, and Technology held a markup and ordered the bill reported by voice vote. H. Rept. 100-673, Part 1 was filed on June 3, 1988. Section 212 of the bill was sequentially referred to the Committee on Energy and Commerce on June 3, 8, and 22, 1988. The Committee's Subcommittee on Commerce, Consumer Protection, and Competitiveness held a hearing on H.R. 4417 on June 30, 1988. On July 8, 1988, the Committee on Energy and Commerce reported the bill with amendments and filed H. Rept. 100-673, Part 2. On August 9, 1988, H.R. 5183 was introduced to be used as substitute Floor text for H.R. 4417, and referred to the Committee on Science, Space, and Technology. On August 11, 1988, the Rules Committee held a hearing and granted a one-hour, open rule. H.R. 4417 passed the House, amended with the text of H.R. 5183, as provided for by the passage of the Rule for its consideration, on September 26, 1988 by voice vote. On September 29, 1988, H.R. 4417 was received in the Senate and referred to the Senate Commerce, Science and Transportation Committee. On October 5, 1988, H.R. 4417 passed the Senate by voice vote, clearing the measure for the President. P.L. 100-519 was signed by the President on October 24, 1988. Committee Publication Numbers 100-96; H. Rept. 100-673, Part 1.

1.13—PUBLIC LAW 100-570, THE NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT OF 1988 (H.R. 4418, S. 1632)

To authorize appropriations for the National Science Foundation, and for other purposes.

Summary and Background of Legislation

As part of its responsibilities, the Committee on Science, Space, and Technology acts on legislation to authorize the activities of the National Science Foundation (NSF). The Committee's legislative actions are based on the budget request for NSF submitted to the Congress by the President.

Public Law 100-570 authorizes the programs of NSF for fiscal years 1989 through 1993. The authorization levels for the various NSF activities are as follows:

Activities	Fiscal year—				
	1989	1990	1991	1992	1993
<i>Research and Related Activities:</i>					
Biological, Behavioral and Social Sciences	288.7	334.6	387.4		
Computer and Information Science and Engineering	162.1	188.0	217.6		
Engineering	198.0	229.5	265.8		
Geosciences	320.9	372.0	430.8		
Mathematical and Physical Sciences	507.8	588.5	681.5		
Science and Technology Centers	25.0	30.0	30.0		
Scientific, Technological and Int'l Affairs	56.0	65.0	75.2		
Program Development and Management	95.0	103.1	111.9		
Subtotal, Research and Related Activities	1,653.5	1,910.7	2,200.2	2,552.0	2,772.0
Science and Engineering Education	175.5	205.3	240.2	281.0	308.0
U.S. Antarctic Program	141.0	147.0	154.1	162.0	175.0
Academic Research Facilities Modernization Program	80.0	125.0	187.5	250.0	250.0
Total	2,050.0	2,388.0	2,782.0	3,245.0	3,505.0

The authorization meets the Administration's goal of doubling the NSF budget by fiscal year 1992. The allocation for the Science and Engineering Education Directorate exceeds \$300 million in the fifth year, and the authorization for the new Academic Research Facilities Modernization Program grows to \$250 million by the fourth year.

For fiscal year 1989, the total authorization \$2.05 billion is identical to the Administration's request; however, there are specific programmatic differences. The Academic Research Facilities Modernization Program, not included in the Administration's budget request, was authorized at a level of \$80 million. An additional \$19.5 million was added to the Administration's request for Science and Engineering Education and the request for \$150 million for five-year, upfront funding of Science and Technology Centers was reduced to \$25 million for the first year, with \$30 million per year in subsequent years.

The Act requires NSF, in awarding planning grants for Science and Technology Centers, to consider the need to establish centers in regions of the U.S. in which there are no major research universities. Also, NSF is directed to encourage consortia of research universities, two-year and four-year colleges, and the private sector to participate in research center award competitions. Finally, in conducting evaluations of research centers, NSF is directed to ensure that evaluation panels are free from conflict-of-interest and that all conditions of award to a center have been fulfilled.

Sections 105 through 108 of Title I make six amendments to the National Science Foundation Act of 1950: (1) exempts discussions

by the National Science Board of proposed NSF budgets from disclosure under the Government in the Sunshine Act until the budget is submitted to Congress; (2) repeals Section 15, an obsolete provision regarding NSF fellowship applications; (3) changes the reporting requirement of the Committee on Equal Opportunities in Science and Engineering from annual to biennial; (4) allows NSF to pay certain expenses and benefits for participants in the NSF Rotator Program directly, rather than as part of salary; (5) requires NSF to submit to Congress annually a three-year budget estimate including funding estimates for all major activities; and (6) requires members of the National Science Board to file a financial disclosure report under title II of the Ethics in Government Act of 1978, except that the reports are held confidential and exempt from any other law otherwise requiring their public disclosure.

Section 111 of Title I, urges NSF, within the restrictions of current international agreements to which the U.S. is a party, to obtain goods and services for direct support of Foundation activities from domestic firms. Further, NSF is required to prepare a report to Congress on the number of foreign and domestic awards in fiscal year 1988, including the number of foreign awards for which technically acceptable domestic bids were received.

Section 112 reinforces the role of NSF in supporting undergraduate research and education.

Section 113 codifies the ongoing Experimental Program to Stimulate Competitive Research and allows states that have received initial awards under the program to compete for follow-on awards.

Section 114 requires NSF to report on the feasibility of establishing a new College University Innovation Research Program for faculty members patterned after the Small Business Innovation Research Program.

Section 115 requires the National Academy of Sciences to conduct an assessment of earthquake engineering activities being conducted by Federal agencies under the Earthquake Hazards Reduction Act of 1977 and to report to Congress on the results of the study, including recommendations for improvements.

Section 116 requires the Office of Science and Technology Policy to prepare a report for Congress on federal research on desalination, including recommendations for a lead Federal agency, for ways to spur research for decreasing the cost of desalination, and for ways in which desalination research and technology can be used as a component of the foreign assistance program of the U.S.

Section 117 amends Title II of the Elementary and Secondary Education Act of 1965 by removing the program for Presidential Awards for Excellence in Mathematics and Science Teaching and reestablishing it in NSF with no change, except that the number of awards is increased to no fewer than 108.

Section 118 prohibits expenditure of any funds authorized for NSF by NSF or by any recipient of an NSF grant or contract award unless all such parties have in place and will continue to administer a written policy designed to ensure that all of its workplaces are free from the illegal use, possession, or distribution of controlled substances.

Title II is cited as the Academic Research Facilities Modernization Act, which supersedes the facilities program authorized in the

Trade Bill (P.L. 100-418). The purpose of this title is to help fund the repair, renovation and, in exceptional cases, replacement of facilities primarily devoted to research. Eligibility for awards under the program is extended to all types of academic institutions, including primarily undergraduate institutions, to nonprofit research institutions, and to research museums. The title specifies certain guidelines and limitations on awards and requires NSF to develop and publish detailed guidelines, with opportunity for public comment. A setaside of 12 percent of all funds authorized for the program is established for minority institutions, including Historically Black Colleges and Universities and other institutions with substantial enrollment of Black, Hispanic and Native American students.

Legislative History

H.R. 4418 was introduced by Mr. Walgren on April 20, 1988 and referred to the Committee on Science, Space, and Technology. It reflected the recommendations of the Subcommittee on Science, Research and Technology as agreed to on April 19, 1988. Prior to the markup, hearings had been held by the Subcommittee on March 22, 23 and 24, 1988, on the Administration's proposed budget for NSF and on selected NSF programs. In addition to the Director of NSF and the Chairman of the National Science Board, witnesses included university administrators, industry representatives, and leaders from the scientific community.

The Committee met to consider H.R. 4418 on May 5 and 12, 1988. On May 12, 1988, the bill was ordered reported with an amendment; and, on May 24, 1988, the Committee report was filed in the House (H. Rept. 100-649).

H.R. 4418 was considered by the House on June 9, 1988. By a roll call vote (No. 177) of 405 to 5, the House agreed to the Committee amendment, as amended by the Roe amendment that established the program on Presidential Awards for Excellence in Science and Mathematics Teaching in NSF; the Roe amendment that removed language imposing certain conflict-of-interest provisions for the members of the National Science Board which are covered by existing law; the Roe amendment that added words "research or service contractor" before "lease" in the description of conditions placed on NSF's acquisition of a research icebreaker for support of Antarctic research; the Boehlert amendment that increased funding for Science and Engineering Education by \$11 million with \$5 million set-aside for programs to improve instruction in 2 year colleges, decreased funding for Research and Related Activities by \$116 million, and authorized \$20 million for the Science and Technology Centers program; the Traficant amendment that required NSF to give preference to domestic firms in contract awards under certain specific circumstances; and the Fields amendment that modified the conditions placed on NSF's acquisition of a research icebreaker by stipulating that no bid submitted by a foreign shipyard receiving government subsidies could be used in determining the "world free market price".

On June 17, 1988, by a recorded vote of 88-1, H.R. 4418 passed the Senate, after having been amended by striking all after the enacting clause and inserting in lieu thereof the text of S. 1632, as

amended, the Senate companion measure. Staff from the House Committee on Science, Space, and Technology and the Senate Committees on Labor and Human Resources and Commerce, Science, and Transportation met to draft a compromise amendment to resolve the House/Senate differences in H.R. 4418. On September 26, 1988, under suspension of the Rules, the House considered H. Res. 547 which had the effect upon adoption of taking H.R. 4418 from the Speaker's table and concurring in the Senate amendment with the compromise amendment. On September 27, 1988, the House agreed to H. Res. 547 by a roll call vote (No. 352) of 402-2. On October 14, 1988, the Senate concurred in the amendment of the House to the Senate amendment, clearing the measure for the President.

H.R. 4418 was signed by the President on October 31, 1988, becoming Public Law 100-570.

Committee Publication Numbers 100-115; H. Rept. 100-649.

1.14—PUBLIC LAW 100-591, AVIATION SAFETY RESEARCH ACT OF 1988
(H.R. 4686)

To amend the Federal Aviation Act of 1958 relating to aviation research.

Summary and Background of Legislation

The purpose of H.R. 4686 is to amend the Federal Aviation Act of 1958 to add additional topics (structures, fire safety, human factors, computer simulation) to those on which the Federal Aviation Administration (FAA) performs research. In addition, the bill (1) requires that FAA prepare annually an Aviation Research Plan, and a report on accomplishments under the previous plan, (2) establishes the Civil Aeromedical Institute within FAA to conduct medical research, (3) establishes an FAA Research Advisory Committee, and (4) amends FAA's existing appropriations authorization for Research, Engineering and Development, and Demonstration, for fiscal years 1989 and 1990 by providing a portion of each amount within the authorization for long-term projects, and increasing the authorization for human factors research.

Concerns which led to the bill were expressed at the Transportation, Aviation and Materials Subcommittee FAA oversight hearings on research and development, May 3 and 4, 1988. These included:

A formal, long range research program should be developed by FAA, reviewed extensively internally and externally by the aviation community, including industry and universities, and presented to Congress.

Few FAA Regulations dealing directly or indirectly with human performance are based on scientific evidence. Human performance concerns regarding cockpit automation, pilot selection and training, and airline management are not addressed adequately.

FAA needs a greater capability for simulation, so that impacts on the ATC system of many kinds of options—ATC procedures changes, additional runways or airports, or a new aircraft—can be modeled before implementation.

Legislative History

H.R. 4686 was introduced by Mr. Lewis on May 25, 1988, and was referred to the Committee on Science, Space, and Technology, where it was referred to the Subcommittee on Transportation, Aviation and Materials.

The Subcommittee on Transportation, Aviation and Materials held a hearing on June 16, 1988, on legislation dealing with aviation safety research, including H.R. 4686. At the hearing, FAA Administrator McArtor's written testimony gave general support for the "thrust of the legislation", but indicated that the authorization language was unnecessary. The testimony also noted that FAA is already doing most of the research identified in the bill. However, on questioning, FAA witnesses did not provide specific information on project funding, staffing, or duration that would have demonstrated the scope and direction of research under way. Expert witnesses from the University of Miami, Massachusetts Institute of Technology, NASA, and the Southwest Research Institute provided testimony on the need for the research programs contained in the Act. Witnesses also cited problems of continuity of FAA's effort over the long-term, of inadequate levels of effort, of applying results to equipment acquisition or proposed regulation, and of maintaining in-house expertise.

The Subcommittee considered H.R. 4686 on June 29, 1988, with six technical amendments and two which legislatively established the Civil Aeromedical Institute. A total of eight amendments were offered and adopted and the bill was forwarded to the Committee.

On August 11, 1988 the Committee on Science, Space, and Technology, a quorum being present, ordered reported, by voice vote the Aviation Safety Research Act of 1988, with an amendment.

On September 20, 1988, H.R. 4686 was brought to the floor of the House under suspension of the Rules and was passed. Committee Publication Numbers 100-109; H. Rept. 100-894.

1.15—PUBLIC LAW 100-627, TITLE II, MARINE PROTECTION, RESEARCH, AND SANCTUARIES ACT REAUTHORIZATION (H.R. 4210)

To reauthorize title II of the Marine Protection, Research and Sanctuaries Act of 1972.

Summary and Background of Legislation

Under the authority of title II of the Marine Protection, Research and Sanctuaries Act of 1972 (P.L. 92-532), and the National Ocean Pollution Planning Act of 1978 (P.L. 95-273), the National Oceanic and Atmospheric Administration (NOAA) coordinates marine pollution research and monitoring activities throughout the Federal government, and, in cooperation with the Environmental Protection Agency, conducts a continuing, comprehensive program of assessment of effects of human activities on the marine environment.

The Marine Protection, Research, and Sanctuaries Act of 1972 was the first comprehensive legislation to regulate ocean dumping of all types of material that may adversely affect human health, the marine environment, or the economic potential of the ocean. Under the first two titles of the Act, commonly referred to as the

Ocean Dumping Act, four Federal agencies have responsibilities: the Environmental Protection Agency, the Corps of Engineers, the Coast Guard, and the National Oceanic and Atmospheric Administration.

Title I of the Act authorizes the EPA to designate specific ocean disposal sites, and directs the EPA to establish ocean dumping permit criteria based upon specified factors. The permit system is administered by EPA for all materials except for dredged material, which is under the jurisdiction of the Corps of Engineers.

Title II of the Act (under the jurisdiction of the Committee on Science, Space, and Technology and the Committee on Merchant Marine and Fisheries) requires the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) to conduct research and monitoring on ocean dumping and to study alternative methods of disposal. The Coast Guard is charged with maintaining surveillance of ocean dumping activities.

Title III of the Act gives the Secretary of Commerce the authority to establish marine sanctuaries if it is determined necessary to preserve or restore an area for conservation, recreational, ecological, or esthetic purposes.

The programs funded under the provisions of Title II include: (1) the Status and Trends Program, which monitors water quality data from various waterbodies around the nation; (2) the Consequences of Contamination Program, which links the chemical data collected in the Status and Trends Program with the actual effects on marine life; (3) the Strategic Assessment Branch, which prepares data, atlases, and maps of various estuaries depicting resources and water quality factors in these areas; and (4) the Hazardous Materials Response Program, which is NOAA's response capability for meeting hazardous material emergencies and conducting long-term resource assessments under the Superfund law.

The Subcommittee on Natural Resources, Agriculture Research and Environment held a hearing in Annapolis, MD on October 3, 1988, on Medical Waste and Ocean Pollution Research and Monitoring. Of primary concern to the Subcommittee was the recent incidence of medical wastes washing up on the shores of the Chesapeake in Maryland.

The Subcommittee also considered specific recommendations on H.R. 4210, the bill to reauthorize title II of the Marine Protection, Research and Sanctuaries Act of 1972, and H.R. 4211, the bill to reauthorize the National Ocean Pollution Planning Act of 1978.

Also relevant to the deliberations of the Subcommittee was the recently released Office of Technology Assessment background paper entitled "Issues in Medical Waste Management."

At the hearing, it was pointed out that the extent of the problem of infectious medical wastes being illegally dumped into waterways or landfills is not known at this time. No scientific surveys to assess the magnitude of the problem have been conducted. The risk posed to human health and to the environment by illegally dumped medical waste is also not known. No scientific assessments have been made and little or no data exists on this issue.

The Environmental Protection Agency has the authority to regulate infectious medical wastes under the Resource Conservation

and Recovery Act (RCRA). However, EPA has indicated that there is a lack of evidence that medical wastes cause harm to human health and the environment, and therefore have not taken action to regulate medical waste or conduct research on its potential hazards.

Since no comprehensive Federal regulations exist regarding the handling, transportation, treatment, and disposal of infectious medical wastes, the States have had to take independent action to regulate such wastes. Currently, 39 States have some type of regulations concerning infectious waste, and at least 5 more are expected to regulate these wastes by the end of the year.

Witnesses at the hearing include the Honorable William Donald Schaefer, Governor of Maryland; Dr. Andrew Robertson, Director of the Ocean Assessments Division, National Oceanic and Atmospheric Administration; Mr. Devereaux Barnes, Director, Characterization and Assessment Division, Environmental Protection Agency; Mr. Charles Spooner, Director, Chesapeake Bay Program, Environmental Protection Agency; Mr. William Baker, Director, Chesapeake Bay Foundation; and Ms. Boyce Thorn Miller, Staff Scientist, The Oceanic Society.

Legislative History

H.R. 4210 was introduced on March 21, 1988, and jointly referred to the Committee on Science, Space, and Technology and the Committee on Merchant Marine and Fisheries. The bill was called up by the House of Representatives under suspension of the Rules and passed on October 3, 1988. The Senate passed the bill, as amended, on October 12, 1988. The House agreed to the Senate amendments by unanimous consent on October 13, 1988. The President signed the bill into law on November 7, 1988, becoming Public Law 100-627.

1.16—PUBLIC LAW 100-636, THE NATIONAL OCEAN POLLUTION PLANNING ACT REAUTHORIZATION (H.R. 4211)

To reauthorize the National Ocean Pollution Planning Act of 1978.

Summary and Background of Legislation

The National Ocean Pollution Planning Act of 1978 identified the need to establish a comprehensive Federal plan for ocean pollution research, development, and monitoring, with particular attention being given to the inputs, fates, and effects of pollutants in the marine environment.

Under the National Ocean Pollution Planning Act (NOPPA), the National Oceanic and Atmospheric Administration (NOAA) was authorized to establish, within NOAA, the National Marine Pollution Program Office. The National Marine Pollution Program Office has the responsibility for preparing a comprehensive 5-year plan for the overall Federal effort in ocean pollution research, development and monitoring.

In late 1985, the National Marine Pollution Program Office issued a Federal plan for fiscal years 1985 to 1989. The plan recommended, among other things, a greater Federal emphasis on re-

search and monitoring related to municipal and industrial effluents; resource oriented monitoring to provide national assessments on the status and trends of environmental quality; studies conducted in estuaries and coastal waters; and better coordination of monitoring efforts. The National Marine Pollution Program Office is expected to release the next 5-year plan by the end of 1988.

Legislative History

H.R. 4211 was introduced on March 21, 1988, and jointly referred to the Committee on Science, Space and Technology and the Committee on Merchant Marine and Fisheries.

The Subcommittee on Natural Resources, Agriculture Research and Environment held a hearing in Annapolis, MD on October 3, 1988 on Medical Waste and Ocean Pollution Research and Monitoring. Of primary concern to the Subcommittee was the recent incidence of medical wastes washing up on the shores of the Chesapeake in Maryland. The Subcommittee also considered specific recommendations on H.R. 4210, the bill to reauthorize title II of the Marine Protection, Research and Sanctuaries Act of 1972, and H.R. 4211, the bill to reauthorize the National Ocean Pollution Planning Act of 1978. For a summary of the hearing, see discussion under the Marine Protection, Research, and Sanctuaries Act Reauthorization, above.

The bill was passed by the House of Representatives under suspension of the rules by a vote of 412-5 on October 4, 1988. The bill passed the Senate without amendment by voice vote on October 19, 1988. The bill was signed into law by the President on November 8, 1988, becoming Public Law 100-636.

1.17—PUBLIC LAW 100-657, COMMERCIAL SPACE LAUNCH ACT AMENDMENTS OF 1988 (H.R. 4399)

To facilitate commercial access to space, and for other purposes.

Background and Summary of Legislation

Public Law 100-657 the "Commercial Space Launch Act Amendments of 1988" amends the Commercial Space Launch Act to: establish property and liability insurance requirements for commercial space launches; provide for government indemnification of liability claims in excess of insurance; prohibit government preemption of commercial space launches from government facilities in most cases; and provide launch incentives for certain satellites that were bumped from the Space Shuttle, if such satellites are launched by private industry in the United States. The Act amends current law to ensure that costs charged to commercial users of federal launching ranges, services, and property are based on the actual costs associated with the commercial launch effort. It specifies that the government can charge for quality control services provided at the request of the commercial user.

Facilitating Private Acquisition of Launch Services.

The act encourages development of commercially provided launch services, and ensures continued access to government

ranges and services by developing a common pricing policy for the use of government launch services. It authorizes NASA and the Air Force to collect reimbursements for activities (e.g., quality assurance) involved at the election of the commercial manufacturer in the production of launch vehicles or payloads.

Insurance Requirements of Commercial Launch Providers.

The Act establishes a statutory standard for the determination of property and liability insurance requirements for domestic commercial ELV operations, as follows:

The launch provider must obtain insurance or demonstrate financial responsibility to compensate for the *maximum probable loss* that might occur to government property or result from third party claims.

The Secretary of Transportation will determine the maximum probable loss to property or third parties based on the launch vehicle size and type, launch trajectory, payload and other relevant factors:

For government property, insurance cannot exceed \$100 million, or the maximum available insurance on the world market, if less than \$100 million is available;

For third party liability, insurance cannot exceed \$500 million, or the maximum available liability insurance on the world market, if less than \$500 million is available.

The Act defines third parties as those persons not associated directly with commercial launch operations; however, to conform to government-wide policy, government personnel directly associated with commercial launch operations are still classified as third parties.

The United States Government is insured under these policies, at no cost to the government.

The \$100 million and \$500 million levels will be reviewed annually by the DOT Secretary and adjusted, if appropriate, to meet altered liability expectations and worldwide insurance capacity.

All parties to the launch are required to enter into reciprocal waivers of claims whereby each party is responsible for any property damage or personal injuries it sustains. (The purpose of this is to limit litigation that could arise from a launch incident and to eliminate the need for parties to obtain insurance to protect them from claims (otherwise straining a limited capacity of insurance). These cross waivers were a standard element of NASA contracts with commercial customers of the Space Shuttle.)

The government participates in the reciprocal waiver with private parties to the launch to the extent property damage would exceed the insurance obtained to cover against potential damage. In such a case, the government would pay for repairs to property if it exceeds insured levels. The government could not waive claims on behalf of its own employees, whose rights will not be affected.

Section 5(b) provides for government indemnification of claims to the degree third party claims exceed insurance (e.g., claims over \$500 million). The government, subject to the avail-

ability of appropriations, would pay third party claims up to a total of \$1.5 billion of exposure per launch incident. This provision would expire after 5 years. This provision completes the "risk-sharing" approach to commercial launch activity, whereby in exchange for being protected under \$100 million property, and \$500 million liability insurance policies obtained by a launch provider, the government provides for indemnification in the event claims exceed insurance.

In the event of a launch incident involving claims in excess of insurance, the President is required to submit a compensation plan to the Congress identifying potential sources of government funding, and recommended legislative language, if required.

Launch Incentives for Certain Satellites.

The Act provides special incentives to certain satellites affected by the President's August 1986 policy decision ending NASA's commercial launch role. The incentives are available to those satellites under construction at the time of August 1986 decision, if these satellites "launch American." The incentives are (1) a waiver of the requirement to purchase property insurance to protect the government facilities; and (2) a waiver, subject to the availability of appropriations, of charges and costs associated with the provision of launch services from the government.

Preemption of Scheduled Launches.

The Act establishes strict standards for government preemption of commercial launches; and would prohibit government cancellation of scheduled commercial launches, unless a finding of imperative national need warranted such a preemption. The NASA Administrator and the DOD Secretary would be required personally to certify such an "imperative need." Moreover, it prohibits duplicative charges from being imposed on users whose launch schedule has been interrupted as a result of government preemption.

Study of Process for Scheduling Launches.

The Act provides for a study of ways of enhancing the efficient use of government range property for government and commercial users.

International Competition.

The Act expresses the sense of Congress that the U.S. Government should explore the development of a dialogue with foreign governments in order to develop guidelines for access to launch services by satellite builders and users for the purpose of ensuring fair international competition in commercial space activities.

Launch Vehicle Research and Development.

The Act directs the NASA Administrator, in consultation with industry, to design a program of research into new launch vehicle component technologies.

Application of the Act.

The provisions of P.L. 100-657 apply to all licenses issued before or after the date of its enactment.

Legislative History

As a result of the hearings held on H.R. 3765 by the Subcommittee on Space Science and Applications, H.R. 4399, which reflects the recommendations of the Subcommittee, was introduced on April 18, 1988, sponsored by Messrs. Nelson of Florida, Roe, Lujan, Walker, Brown of California, Packard, Volkmer, Smith of New Hampshire, Mineta, Slaughter of Virginia, Torricelli, Konnyu, Traficant, Beuchner, Chapman, Hefley, Perkins, Morella, McMillen of Maryland, Lewis of Florida, Nagle, Hayes of Louisiana, Hall of Texas, MacKay, Skaggs, Nowak, Lagomarsino, Sensenbrenner, Lloyd, and Scheuer.

The Committee met on April 21, 1988 to markup H.R. 4399 and ordered it reported. On May 19, 1988, a report was filed in the House (H. Rept. 100-639) and on May 24, 1988, the House passed the measure under suspension of the Rules. It was received in the Senate on May 25, 1988, and was referred to the Committee on Commerce, Science and Transportation. On September 30, 1988 the Senate Committee ordered the bill reported with an amendment in the nature of a substitute and on October 7, 1988 filed (S. Rept. 100-593). On October 14, 1988, the Senate passed H.R. 4399, after agreeing to a committee amendment in the nature of a substitute, and an amendment to revise the period of applicability of Federal financial support for launches. The measure was received in the House on October 18, 1988. On October 21, 1988, the House concurred in the Senate amendments thereto by the roll call vote of 355 ayes to 1 nay (Roll Call No. 456) clearing the measure for the President.

P.L. 100-657 was signed by the President on November 15, 1988.

The following activities were conducted on H.R. 3765, which was superseded by H.R. 4399.

On September 15 and 17, 1987, the Subcommittee on Space Science and Applications held hearings prior to introduction. Congressman Bill Nelson of Florida introduced H.R. 3765 on December 15, 1987 and the measure was referred to the Subcommittee on Space Science and Applications on December 21, 1987. Further hearings were held on February 16 and 17, 1988. On April 14, 1988, the Subcommittee marked up H.R. 3765 and ordered a clean bill to be introduced reflecting the Subcommittee recommendations. Committee Publication Numbers 100-79; 100-114; H. Rept. 639.

1.18—PUBLIC LAW 100-680, THE STEEL AND ALUMINUM ENERGY CONSERVATION AND TECHNOLOGY COMPETITIVENESS ACT OF 1988 (S. 2470)

To promote energy conservation and technology competitiveness in the American steel and aluminum industries.

Summary and Background of Legislation

During the past two Congresses, the technology needs of the steel industry have been the focus of a number of hearings by both

the Subcommittee on Energy Research and Development and the Subcommittee on Science, Research and Technology. These hearings have led to the general conclusion that research capabilities within the steel industry are substantially below where they were a decade ago while U.S. dependence on steel technology for a competitive edge is at an all-time high. This, in turn, led to the Committee on Science, Space, and Technology supporting a Steel Initiative program in both the Department of Energy and the National Institute for Standards and Technology, which would make the considerable expertise in materials science and manufacturing of the National Laboratories available to the steel industry as it attempts to develop leapfrog technology to revolutionize the steel-making and steel finishing process.

During the 99th Congress, Congressman Doug Walgren (D-PA) introduced H.R. 4416, the Comprehensive Steel Technology Research and Development and Energy Conservation Act of 1986; a variation of this bill was reported by the House Committee on Science, Space, and Technology as part of the 1987 Department of Energy Authorization legislation (H.R. 1798, 99th Congress). Funds were appropriated for the program (P.L. 99-190) and the Department of Energy has issued a management plan and solicited proposals from industry under the program. S. 2470, the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 follows the general outline of the Steel Initiative while extending it to the aluminum and copper industry as well.

The purpose of S. 2470 is to establish a federal research and development program to promote energy conservation and technology competitiveness in the steel and aluminum industries. The bill requires the Secretary of Energy to prepare a management plan for carrying out such research and development. The bill further requires the National Institutes of Standards and Technology (NIST) (formerly the National Bureau of Standards) to conduct an expanded program of steel and aluminum research in support of the Department of Energy activities. Funding is authorized for the Department of Energy at the following levels: \$2 million in FY 1989, \$20 million in FY 1990, and \$25 million for fiscal year 1991. For NIST, the bill authorizes \$3 million per year for each of the three years.

Legislative History

S. 2470 was introduced by Senators Metzenbaum and Heinz on June 8, 1988, and was the subject of a Senate hearing on July 1, 1988 in Independence, Ohio. On July 27, 1988 the bill was reported by the Senate Committee on Energy and Natural Resources and passed by the Senate on August 9, 1988 (Congressional Record pages S11204-5). On September 7, 1988, the bill was referred to the Committee on Science, Space, and Technology in the House and in turn was referred jointly to the Subcommittee on Energy Research and Development and the Subcommittee on Science, Research and Technology.

The Subcommittee held a joint hearing on S. 2470 on September 15, 1988. The Subcommittee on Energy Research and Development marked up the bill on September 22, 1988 and reported to the bill, as amended, to the Full Committee.

On October 3, 1988, the Subcommittee on Science, Research and Technology was discharged from further consideration of the legislation, and the Committee on Science, Space, and Technology conducted markup, amended, and ordered the bill reported. S. 2470 was reported to the House, with amendments, on October 6, 1988 (H.Rept. 100-1061), and placed on the Union Calendar. The bill passed the House by voice vote, under suspension of the Rules, on October 12, 1988. On October 21, 1988, the Senate agreed to the House version, clearing the measure for the President. Public Law 100-680 was signed by the President on November 17, 1988. Committee Publication Number H. Rept. 1061.

1.19—PUBLIC LAW 100-685, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1989 (S. 2209/H.R. 4561 [H.R. 4157; S. 1667; H.R. 3779])

To authorize appropriation to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes.

Background and Summary of Legislation

The Committee on Science, Space, and Technology is responsible for annual authorizations for the National Aeronautics and Space Administration programs. This jurisdiction is shared by two Subcommittees: Space Science and Applications for space programs; and Transportation, Aviation and Materials for aeronautical research and technology.

As approved by Congress, P.L. 100-685 authorizes appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes. P.L. 100-685 also authorizes appropriations to the Department of Transportation's Office of Commercial Space Transportation, the National Oceanic and Atmospheric Administration; establishes a National Space Council in the Executive Office of the President; and provides for air traffic controller performance research.

P.L. 100-685 authorizes appropriations to NASA as follows:

	<i>Fiscal Year 1989</i>
Research and Development	\$4,322.1
Space Station	1 900.0
Space Transportation Capability Dev.	606.6
Physics and Astronomy	761.6
Life Sciences	91.7
Planetary Exploration	410.3
Space Applications	628.3
Technology Utilization	19.1
Commercial Use of Space	38.8
Aeronautical Research and Technology	404.2
Space Research and Technology	350.9
Transatmospheric Research and Technology	69.4
Safety, Reliability and Quality Assurance	22.4
Tracking and Data Advance System	18.8
Space Flight Control and Data Communications	4,686.2
Shuttle Production and Operations Capacity	1,335.5
Space Transportation Operations	2,365.4
Space and Ground Network	985.3

	<i>Fiscal Year 1989</i>
Research and Program Management	1,915.0
Construction of Facilities	290.1
Total	11,213.4

¹ Funding for: FY 1990=\$2,130.2; FY 1991=\$2,912.5.

The Act established specific goals and objectives for science and applications, space research and technology, space exploration, space transportation, commercial use of space, aeronautical research and technology development and validation, technology utilization and facilities and administrative costs. Moreover, it establishes the framework for multiyear authorizations by requiring the President to submit a multiyear (2 year with 3rd year budget estimates) budget request for NASA beginning in 1989, and requires the NASA Administrator to submit to Congress a 5-year capital development program.

The following listing describes additional provisions of the Act:

Authorizes NASA to solicit bids for privately financed facilities for the Advanced Solid Rocket Motor production;

Directs NASA to undertake studies on the Nation's micro-gravity research capability;

Directs the Administrator to "Buy American";

Directs NASA to undertake international cooperative efforts leading toward an international space docking capability and the establishment of international docking interface standards;

Renames the National Space Technology Laboratories the "John C. Stennis Space Center";

Authorizes NASA to purchase fuel from the Department of Energy at direct costs for planetary deep space missions;

Establishes a policy for a drug free workplace for NASA employees;

Establishes an Ohio Center for Aerospace, for the conduct of aeronautical and space research, education and training of aeronautical and space engineers and the transfer of aeronautical and space technology;

Reiterates current policy that the civil Space Station is authorized for peaceful purposes only;

Sets forth a ten-year strategic plan for aeronautics and space and requires the Administrator to submit such a plan consistent with the goals outlined in the legislation; and

Amends the Aeronautics and Space Act of 1958 to add research and technology development related to associated manufacturing processes to the list of NASA objectives.

Department of Transportation

P.L. 100-685 authorizes appropriations to the Department of Transportation's Office of Commercial Space Transportation for FY 1989 as follows:

Office of Commercial Space Transportation	\$3,827.0
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National Oceanic and Atmospheric Administration (Provisions of S. 1667)

Title IV of P.L. 100-685 authorizes appropriations to the National Oceanic and Atmospheric Administration for FY 1989 as follows:

National Environmental Satellite, Data, and Information Service:	
Satellite Observing Systems.....	383.0
Environmental Data Management System.....	25.0
Subtotal.....	408.0
National Weather Service:	
Operations and Research.....	279.0
Systems Acquisition.....	98.5
Subtotal.....	377.5
Office of Oceanic and Atmospheric Research:	
Climate and Air Quality Research.....	51.0
Atmospheric Programs.....	44.0
Subtotal.....	95.0
Grand total.....	880.5

In addition, Title IV directs the Secretary of Commerce to prepare and submit to Congress a National Implementation plan, a 10-year strategic plan for the modernization of weather services:

Prohibits the closure, automation, consolidation, or relocation of weather service offices pursuant to the implementation of the strategic plan until the Secretary has certified to Congress that such action will not result in any degradation of weather services provided to the affected area;

Authorizes the Secretary of Commerce to assess fees, at fair market value, for access to environmental data archived by the National Environmental Satellite, Data, and Information Service of the National Oceanic and Atmospheric Administration;

Directs the Secretary of Commerce, in consultation with NASA and the State Department, to submit to Congress a plan to construct and operate a worldwide system of ground-based remote sensors to monitor the levels of chemicals which can affect the stratospheric ozone layer; and

Directs the National Weather Service to maintain and make available an updated data base describing the acid content in precipitation in the United States.

National Space Council

Title V of P.L. 100-685 establishes a National Space Council in the Executive Office of the President, effective February 1, 1989 to be chaired by the Vice President.

Air Traffic Controller Performance Research (Provisions of H.R. 3779)

Title VI of P.L. 100-685 directs the Federal Aviation Administration in coordination with the National Aeronautics and Space Administration, to conduct research on:

Improving air traffic controller training;

The human operator, "man-machine interface" issues connected with the increased automation of the controller functions; and

Exploitation of automated system for communicating between pilots and controllers.

Legislative History of P.L. 100-685 (S. 2209/H.R. 4561 [H.R. 4157; S. 1667])

The Administration's request (Administration proposal, No. 3071), H.R. 4157, was introduced by Mr. Roe on March 15, 1988.

To authorize appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities, and research and program management, and for other purposes.

The Subcommittees of jurisdiction (Subcommittee on Space Science and Applications and the Subcommittee on Transportation, Aviation, and Materials) held numerous hearings on H.R. 4157 which culminated in the introduction of H.R. 4561, a bill that reflected the recommendations of both Subcommittees.

H.R. 4561 was introduced on May 10, 1988 by Mr. Nelson of Florida, Mr. McCurdy, Mr. Walker, and Mr. Lewis of Florida.

To authorize appropriations to the National Aeronautics and Space Administration for research and development, space flight, control and data communications, construction of facilities and research and program management, and for other purposes.

On May 12, 1988, the Committee marked up H.R. 4561 and ordered the bill reported with an amendment. House Report 100-650 was filed on May 24, 1988. The Committee on Rules held a hearing on May 25, 1988, and granted an open rule with one hour of debate.

On June 2, 1988, H.R. 4561 passed the House by a roll call vote (No. 165) of 360 ayes to 26 nay, after agreeing to the following amendments: (1) the Committee amendment in the nature of a substitute; (2) a Roe technical amendment; (3) a Skaggs amendment that requires the Administrator to undertake discussions with representatives of countries and international entities re: the development of international docking interface standards for spacecraft docking; and (4) a Traficant amendment requiring the Administrator to report to Congress contracts entered into with foreign entities, and report on the number of contracts that meet the "Buy American" requirements, but which are determined by the United States Trade Representative to be in violation of the General Agreement on Tariffs and Trade (GATT). H.R. 4561 was received in the Senate on June 7, 1988, and was referred to the Committee on Commerce, Science and Transportation. The Senate Committee did not act on H.R. 4561, instead marking up S. 2209.

On July 26, 1988, the Senate Committee on Commerce, Science, Transportation filed S. Rept. 100-429, a report to accompany S. 2209, the Senate companion bill. On August 9, 1988, S. 2209 passed the Senate, after agreeing to the Committee amendment in the nature of a substitute, and the following amendments: (1) Byrd (for Glenn and Metzenbaum) amendment No. 2827, to provide authority for the lease of certain property and the making of certain agreements related to the construction and operation of an aerospace institute in Ohio; and (2) Byrd (for Hollings) amendment No. 2828, to authorize certain atmospheric and satellite programs and functions. S. 2209 was then returned to the House for its consideration.

On October 19, 1988, the House passed S. 2209, with an amendment, under suspension of the Rules and on October 21, 1988, the Senate concurred in the amendment of the House to S. 2209 clearing the measure for the President.

P.L. 100-685 was signed by the President on November 17, 1988. Committee Publication Numbers 100-94; H. Rept. 100-650.

1.20—PUBLIC LAW 100-697, NATIONAL SUPERCONDUCTIVITY AND
COMPETITIVENESS ACT OF 1987 (H.R. 3048)

To provide for the development of a National Action Plan on high-temperature superconductivity and other purposes.

Summary and Background of Legislation

Recent discoveries of new, high-temperature superconducting materials open the way to potentially revolutionary changes in communication, transportation and energy use. The new materials, complex ceramics of copper and rare-earth oxides, exhibit superconductivity at temperatures well above that of liquid nitrogen, a plentiful and inexpensive coolant. Expectations are that even higher temperatures are likely, possibly as high as room temperature. News of the new materials has generated renewed efforts in Japan, China, Europe and elsewhere to understand and apply the new materials. This bill establishes a five-year national action plan to research and develop high-temperature superconducting materials, and designates the Office of Science and Technology Policy to develop the plan, in cooperation with the National Critical Materials Council and the National Commission on Superconductivity.

Legislative History

H.R. 3048 was introduced by Mr. McCurdy and Mrs. Schneider on July 29, 1987. As introduced, the bill was referred to the Committee on Science, Space, and Technology and subsequently referred to the Subcommittee on (1) Energy Research and Development, (2) Transportation Aviation and Materials, and (3) Science Research and Technology. The Committee held an overview hearing on June 10, 1987. The Subcommittee on Energy Research and Development held hearings on October 20, 1987, June 28, 1988, and July 27, 1988. The Energy Research and Development Subcommittee considered and passed an amendment in the nature of a substitute offered by Chairman Lloyd on August 3, 1988. October 7, 1987, the Subcommittee on Transportation, Aviation and Materials, jointly with the Subcommittee on Science, Research and Technology, considered H.R. 3048 in a hearing on superconductivity activities in the Federal Government. Markup of this legislation was held on July 7, 1988, by the Subcommittee on Transportation, Aviation and Materials and the bill was ordered forwarded, with amendments, to the Committee. The Subcommittee on Science, Research and Technology considered H.R. 3048 and ordered it forwarded to the Committee with an amendment in the nature of a substitute on August 10, 1988. An amended version of H.R. 3048 reflecting the recommendations of the three subcommittees of jurisdiction, was considered and passed by the Committee on August 11, 1988. The bill was filed in the House on September 9, 1988 (H. Rept. 100-900); and subsequently passed the House by voice vote on September 20, 1988. The Senate agreed to the House bill with an amendment by voice vote on October 5, 1988. The House agreed to the Senate amendment with an amendment by the roll call vote of 353 ayes to 1 voting "present", on October 21, 1988. The Senate agreed to the House amendment on October 21, 1988; subsequently receding from its amendment, and thereby clearing the measure

for the President. Public Law 100-697 was signed by the President on November 19, 1988. Committee Publication Numbers 100-56; 100-57; 100-69; H. Rept. 100-900.

1.21—H. CON. RES. 290 (S. CON. RES. 131), THE ESTABLISHMENT OF A UNITED STATES DECADE FOR NATURAL DISASTER REDUCTION

Supporting the International Decade for Natural Disaster Reduction (IDNDR) by endorsing the establishment of a United States Decade for Natural Disaster Reduction.

Summary and Background of Legislation

Natural hazards such as earthquakes, windstorms, floods, landslides, wildfires, and drought continue to take their toll in lives and human suffering. About three million people around the world have been killed by natural hazards in the past two decades and the lives of 800 million people have been adversely affected. Short-term economic losses have been estimated at \$1 to \$5 billion annually. Mounting losses of life and property, and economic and political insecurity, exacerbated by the effects of disasters, spurred an organized worldwide effort to reduce the effects of natural disasters.

On December 11, 1987, the United Nations (UN) passed the resolution by unanimous consent (UN General Assembly 42/169) to designate the 1990's as a decade in which the international community, under the auspices of the United Nations, will pay special attention to fostering international cooperation in the field of natural disaster reduction. Through concerted international and national actions, the IDNDR's primary objective is to reduce loss of life, property damage, and social and economic disruption caused by natural disasters. Goals of the IDNDR are to improve the capacity of each country to mitigate the effects of natural disasters within its own boundaries and to do so in concert with other nations to reduce the effects of natural disasters worldwide. Special attention will focus on devising appropriate guidelines and strategies that are sensitive to different cultural, social, economic, and political processes for applying existing knowledge about the reduction of disasters with respect to the unique nature of localities and regions at risks. The initiative will have a scientific and engineering component, which will address risk assessment and engineered solutions. The IDNDR will also be aimed at disseminating existing, and new information on preparedness and non-structural mitigation of natural disasters.

The critical element for the success of the program will be the participation of UN member nations and other institutions. Integrated participation is designed to foster international cooperation and to provide the coordination of each country's national program as well. U.S. participation is a vital part of this international initiative. Through concerted international and national efforts, the decade's objective is the reduction of worldwide loss of life and property, along with the reduction of accompanying social and economic disruption. Therefore, the establishment of a U.S. Decade for Natural Disaster Reduction would be an important contribution to the IDNDR.

Participation by the United States could help focus and integrate disaster reduction efforts within the United States. Existing and new cooperative efforts in programs already underway in the United States, such as the National Earthquake Hazard Reduction Program and others which address floods, coastal erosion, wildlife, and hurricanes, could focus on further reduction of the devastating impact of natural hazards in the United States.

The Committee has exercised continued oversight of the National Earthquake Hazards Reduction Program and is concerned with the scientific, engineering, and societal components of that program for the reduction of natural and technological hazards. While research has been a major component of the program, the Committee is also concerned with the problems encountered in the dissemination of research to reduce the effects of natural and technological disasters.

The main thrust of the International Decade for Natural Disaster Reduction and the U.S. Decade for Natural Disaster Reduction will be to disseminate existing and new information related to measures for the assessment, prediction, prevention, and mitigation of natural disasters. H. Con. Res. 290 encourages the federal agencies to enhance existing cooperative efforts and to promote new cooperative efforts to reduce the devastating impact of natural hazards in the United States and throughout the world.

Legislative History

H. Con. Res. 290 was introduced by Mr. Brown of California (for himself, Mr. Walgren, Mr. Scheuer, Mr. Lewis of California, Mr. Lowry of Washington, Mr. Lujan, Mr. Boehlert, Mr. Roe, Mr. Skaggs, Mr. Nowak, Mr. Hansen, Mr. Mineta, and Mr. Perkins) on May 3, 1988. The resolution was referred solely to the Committee on Science, Space, and Technology and subsequently was referred on May 9, 1988 to the Subcommittee on Science, Research and Technology.

The Subcommittee considered components of H. Con. Res. 290 in hearings conducted to reauthorize the National Earthquake Hazards Reduction Act of 1977 on March 10, 1987, and in hearings held on November 10, 1987 to determine hazard reduction lessons which could be learned from the October 1, 1987 Whittier Narrows, California earthquake.

On August 11, 1988 the Subcommittee on Science, Research and Technology was discharged from further consideration. Subsequently, the Committee on Science, Space, and Technology considered and ordered the resolution reported, without amendment, by voice vote.

On September 20, 1988, H. Con. Res. 290 was called up by the House under suspension of the Rules and passed by voice vote. The resolution was referred to the Senate Committee on Foreign Relations on September 22, 1988. The Senate Committee was discharged from further consideration on October 19, 1988, and the Senate passed S. Con. Res. 131, the identical Senate companion resolution to H. Con. Res. 290. Committee Publication Numbers 100-14; 100-63. (H. Rept. 100-920)

1.22—H. RES. 55, IN MEMORIAM OF THE CREW OF THE SPACE SHUTTLE
"CHALLENGER"

Background and Summary of Legislation

January 28, 1986, was the date of the loss of the Space Shuttle "Challenger" and its crew of seven astronauts. In memoriam to the crew of the "Challenger," to commend the efforts of those requested to explore the causes of the accident, and to ensure the future excellence of the programs of civilian space exploration as performed by the National Aeronautics and Space Administration; as well as to look to the future of those civilian space programs of the United States with optimism, by utilizing the lessons learned from the loss of the "Challenger" and its crew, H. Res. 55 was introduced by Chairman Roe and Mr. Lujan, Jr.

Legislative History

H. Res. 55 was introduced in the House on January 26, 1987, and referred to the Committee. On January 28, 1987, the resolution was considered and passed by the House.

1.23—H. RES. 369, TO COMMEMORATE THE 25TH ANNIVERSARY OF THE
CERRO TOLOLO INTER-AMERICAN OBSERVATORY

H. Res. 369 commemorates the 25th anniversary of the Cerro Tololo Inter-American Observatory (CTIO) in La Serena, Chile, a national facility funded by the National Science Foundation. The resolution recognizes the observatory as "one of the world's most modern and well-equipped major international research centers for frontier research in ground-based astronomy." The measure commends the CTIO for providing a model for United States-Chilean scientific cooperation, as well as Latin American cooperation. In addition, the resolution cites 25 years of successful management by the facility's directors and the presidents of the Association of Universities for Research in Astronomy (AURA).

Summary and Background of Legislation

In 1957, a group of university scientists and administrators organized the AURA for the expressed purpose of contracting with the National Science Foundation (NSF) for the construction and operation of a national optical observatory. In 1962, after extensive site surveys, leading AURA scientists and NSF representatives chose Cerro Tololo near La Serena, Chile, as the optimum location for the optical observatory. The importance of the Southern Hemisphere to astronomy had been apparent for many years. Scientists worldwide agreed that the globular star clusters that contained some of the oldest known stars in the galaxy could prove invaluable for testing theories of stellar evolution.

The role of the CTIO has remained unchanged since its inception—to provide excellent research facilities in the Southern Hemisphere to all astronomers. To accomplish this end, the Observatory operates seven telescopes ranging in size from 0.6 to 5 meters, the latter being the largest built telescope in the Southern Hemisphere to date. The power of these telescopes has advanced with the recent installation of modern detectors and computer systems. To date,

more than 200 visiting astronomers a year from the United States, Latin America, Canada, and Europe use the CTIO's facilities.

NSF is the lead-agency for federal support of ground-based astronomy. Since 1976, NSF has maintained a relatively constant role, providing about 67 percent of all federal support to this area of research and approximately 50 percent of academic research. The other principal sources of federal support are the National Aeronautics and Space Administration (NASA) and the Department of Defense (DOD).

NSF activities in ground-based astronomy are coordinated with the space-based activities of NASA via frequent staff contacts, coordination meetings, joint participation in advisory and planning groups, and other means. Continued activities in space astronomy—including the need for coordinated observations in different wavelength regions and the opportunities to follow up discoveries expected from such instruments as the NASA Space Telescope—will increase the demands on ground-based facilities.

The NSF, through the Division of Astronomical Science (in the Directorate of Math and Physical Sciences), funds three national astronomy observatories. CTIO is part of one such observatory, the National Optical Astronomy Observatories (NOAO).

CTIO's scientific, technical, and administrative staffs, as well as many of the support personnel, are headquartered in a 42-acre compound located within walking distance of downtown La Serena. The permanent scientific staff consists of fourteen astronomers and physicists from the U.S. and nine Chileans. Approximately 100 Chileans make up the support staff; AURA's original agreement with the government of Chile mandates that any vacancy will be filled with a Chilean citizen unless none are available who possess the training and skills essential to the job. CTIO is considered one of the most desirable employers for technical skills within Chile and usually finds it easy to attract and retain some of the best Chilean talent. The Chilean and U.S. staffs are well integrated, work well together, and represent a model of how international cooperation can work. Several Chileans occupy the highest management positions under the U.S. Director, Dr. Robert Williams. English and Spanish are spoken at the compound and at the Observatory.

On January 20-22, 1988, in La Serena, Chile, the AURA celebrated the 25th anniversary of the Cerro Tololo Inter-American Observatory. The main event on the occasion was a symposium titled "Progress and Opportunities in Southern Hemisphere Optical Astronomy" consisting of invited talks and a poster session for contributed papers.

On January 22, 1988, the Committee on Science, Space, and Technology delegation toured the facilities and was briefed on the CTIO and the future of optical astronomy by NOAO Director Dr. Sidney Wolff.

Perhaps CTIO's most notable recent involvement has been with the optical and infrared observations of Supernova 1987A in the Large Magellanic Cloud galaxy. CTIO was in the right place at the right time and equipped with superb instrumentation of just the right kind to obtain photometric and spectroscopic data on this unique event in our lifetime.

However, CTIO preeminence in optical astronomy is being challenged by recent advances in mirror technology in the 8-meter range. CTIO is actively discussing possible cost-sharing options with other nations to construct an 8-meter telescope in both the northern and southern hemisphere. NOAO estimates that the total cost for research, development and construction of these telescopes will be \$100 million over 5-7 years. This 8-meter configuration, resembling the 4-meter sister telescopes on Mauna Kea and CTIO, will be intermediates to the ultimate 16-meter telescopes which will be available the second half of the next decade.

Legislative History

H. Res. 369 was introduced by Mr. Roe and Mr. Lujan, Jr., on February 8, 1988. The resolution was referred solely to the Committee on Science, Space, and Technology.

The Committee considered components of H. Res. 369 in the National Science Foundation Authorization hearings, held on March 22, 23, and 24, 1988 and received testimony during that time from Dr. Authur B.C. Walker, Chairman of the NSF Astronomy Advisory Panel.

On February 16, 1988, H. Res. 369 was called up by the House under suspension of the Rules and passed by voice vote. Committee Publication Numbers Serial 100-N; 100-115.

1.24—H. RES. 450, RESEARCH AND DEVELOPMENT ON FATIGUE AND CORROSION IN AGING AIRCRAFT

Summary and Background of Legislation

The purpose of H. Res. 450 is to express the sense of the House that the Federal Aviation Administration (FAA) should immediately establish a research and development program to study structural fatigue, wear, corrosion and damage to aircraft resulting from age and intensive utilization and to conduct nondestructive and destructive testing of older aircraft on a regular basis.

The resolution grew out of the Subcommittee on Transportation Aviation and Materials' 1986 "Geriatric Aircraft" hearing, where witnesses expressed concern that existing knowledge might not be sufficient, in view of the current practice of operating aircraft beyond the lives for which they were originally designed. The April 28, 1988 Aloha Airlines accident resulted from the kind of defect that had been anticipated by the hearing.

The FAA oversight hearings, on May 3-4, 1988, explored the aging aircraft question again, and the Office of Technology Assessment testified that FAA had done very little research in this area, and lacked critical expertise. On June 1, 1988 an FAA conference on aging aircraft yielded broad agreement that more R&D would be useful. The strongest support for the resolution comes from an interest in putting what we already know into practice. Effects of corrosion are less understood than fatigue. Improved inspection techniques drew a wide range of support, as they could be made less tedious and more automated. Tear-down inspections have been useful but are expensive and what is learned from one aircraft does not apply to all aircraft, because of the individual differing interactions between usage patterns, corrosion, fatigue, and repair history.

Legislative History

H. Res. 450 was introduced by Mr. Glickman on May 17, 1988, and was referred to the Committee, which in turn referred it to the Subcommittee on Transportation, Aviation and Materials.

On June 16, 1988, the Subcommittee on Transportation, Aviation and Materials held a hearing on legislation dealing with aviation safety research, including H. Res. 450. At the hearing, FAA Administrator McArtor noted general agreement with the resolution, and indicated that FAA was taking steps to carry out the recommendations in H. Res. 450, particularly as they had been developed at the Conference on Aging Aircraft.

The Subcommittee considered the resolution and forwarded it to the Committee, with an amendment on June 29, 1988. On August 11, 1988, the Committee ordered it reported, by voice vote, with an amendment. The report was filed in the House on September 8, 1988 (H. Rept. 100-895). H. Res. 450 passed the House under suspension of the Rules on September 20, 1988. Committee Publication Numbers 100-109; H. Rept. 100-895.

1.25—H. RES. 574, COMMEMORATING THE SUCCESSFUL RETURN TO FLIGHT OF THE SPACE SHUTTLE "DISCOVERY"

The purpose of H. Res. 574 is to salute the efforts of everyone involved in returning the United States to space, in the wake of the accident of the Space Shuttle "Challenger," which occurred on January 28, 1986. Those efforts culminated in the successful flight of the Space Shuttle "Discovery" (STS-26) and her crew on September 29, 1988.

Legislative History

H. Res. 574 was introduced by Chairman Roe on October 5, 1988. The resolution was referred to the Committee. On October 12, 1988, the Committee was discharged from further consideration, and the resolution passed the House under suspension of the Rules, by the roll call vote of 395 ayes to 0 nays.

CHAPTER II—OTHER LEGISLATIVE ACTIVITIES OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

2.1—THE NATIONAL NUTRITION MONITORING AND RELATED RESEARCH ACT OF 1988 (H.R. 2151; S. 1081)

To establish a coordinated National Nutrition Monitoring and Related Research Program, and a comprehensive plan for the assessment of the nutritional and dietary status of the United States population and the nutritional quality of food consumed in the United States, with the provision for the conduct of scientific research and development in support of such program and plan.

Background and Summary of Legislation

During the past several years, the Subcommittee on Science, Research, and Technology, in conjunction with the Subcommittees of the Committee on Agriculture, have held hearings on the adequacy of current nutrition monitoring activities and recommendations for enhancing the effectiveness and benefits of a comprehensive system. Public witnesses recommended that an effective nutrition monitoring system was imperative to the development of nutrition, agriculture, and health policies in the United States, and that a legislative mandate would assist in establishing a central focus and identifiable resources for federal nutrition monitoring activities. In response to needs and recommendations suggested at these hearings, nutrition monitoring and related research legislation, similar in nature, was introduced in the 98th, 99th, and 100th Congresses.

H.R. 2151 and S. 1081, identical bills, were introduced in the 100th Congress. Primarily the legislation is: to make more effective use of federal and state expenditures for nutrition monitoring; to enhance the performance and benefits of current federal nutrition monitoring and related research activities; to establish and facilitate the timely implementation of a coordinated National Nutrition Monitoring and Related Research Program; and to establish a central federal focus for the coordination, management, and direction of federal nutrition monitoring activities.

The legislation requires the Department of Agriculture and the Department of Health and Human Services to prepare a 10-year plan for nutrition monitoring, creates an advisory committee on nutrition monitoring, and requires both departments to approve all dietary guidance.

Legislative History

On April 23, 1987, the National Nutrition Monitoring and Related Research Act of 1987 (H.R. 2151) was introduced by Congressmen MacKay, Brown of California, and Walgren along with 20 cosponsors. S. 1081 was also introduced on April 23 by Senator Bingaman along with 12 cosponsors. H.R. 2151 was jointly referred to the

House Committees on Agriculture, and Science, Space, and Technology; in the Senate the bill was referred to the Committee on Governmental Affairs.

On March 1, 1988, the Senate Committee on Governmental Affairs held a hearing to examine nutrition monitoring in the context of current federal nutrition research and dietary guidance activities. On March 22, 1988, the Governmental Affairs Committee held a hearing on S. 1081. On April 14, 1988, the Governmental Affairs Committee marked up S. 1081 and voted unanimously to favorably report the bill (S. Rept. 100-409). S. 1081 passed the Senate by unanimous consent on August 9, 1988. In the House, the bill was jointly referred to the Committee on Agriculture and the Committee on Science, Space, and Technology on September 7, 1988.

On September 30, 1988, the Subcommittee on Science, Research and Technology held a hearing on S. 1081, as passed by the Senate, to examine the need for a legislative proposal for a national nutrition monitoring and related research program, the adequacy of current national nutrition monitoring activities, and a proposed amendment in the nature of a substitute to S. 1081 as passed by the Senate. Administration witnesses included Mr. Jim Harrell, Acting Director, Office of Disease Prevention and Health Promotion, Department of Health and Human Services and Dr. Suzanne S. Harris, Deputy Assistant Secretary for Food and Consumer Services, U.S. Department of Agriculture. Public sector witnesses included representatives of the Association of State and Territorial Public Health Nutrition Directors, the National Cattlemen's Association, and the American Heart Association.

Administration witnesses opposed the bill, arguing that significant progress on nutrition monitoring activities had been made in the past several years. They noted then an explicit legislative mandate for nutrition coordination already exists under P.L. 95-113 (the Food and Agriculture Act of 1977). Specifically, subchapter IV, the National Food and Human Nutrition Research and Extension Program requires a comprehensive nutritional status monitoring system, an evaluation of which was published on July 25, 1986. A second evaluation is currently underway, with completion expected by the end of 1989. The agencies believe a commitment to a coordinated system was further exemplified by the accomplishments realized through the DHHS-USDA Joint Implementation Plan for a Comprehensive National Nutrition Monitoring System submitted to Congress in 1981 and the Operational Plan for National Nutrition Monitoring submitted to Congress in 1987. Witnesses representing agriculture, food, and health organizations reiterated the need for an expanded, enhanced, and more effective national nutrition monitoring system, and also endorsed the amendment in the nature of a substitute under consideration by the Subcommittee on Science, Research and Technology.

On October 3, 1988, the Committee discharged the Subcommittee on Science, Research and Technology from further consideration of the bill, adopted an amendment in the nature of a substitute by voice vote, and ordered the bill reported (H. Rept. 100-1067). The amendment adopted clarified terminology, made technical changes, and included two amendments added to the original amendment in the nature of a substitute before the Committee. The Committee

adopted by voice vote an amendment offered by Congressman Lujan, Jr. to require a report describing the appropriate federal role in assuring that those students enrolled in U.S. medical schools and the physicians practicing in the U.S. have access to adequate training in the field of nutrition and its relationship to human health. An amendment offered by Congressman Lujan, Jr. to delete title II was defeated by a recorded vote. The Committee also adopted, by voice vote, an amendment offered by Congressman Walker to require departments, agencies, and instrumentalities of the United States to develop and implement written policies designed to ensure that all federal workplaces are free from the illegal use, possession, or distribution of controlled substances by officers and employees of the respective agencies and their grantees and contractors.

The Committee on Agriculture deferred consideration of the bill on October 4, 1988, to expedite consideration by the House. On October 6, 1988, the Chairman of the Committee on Energy and Commerce expressed support for S. 1081, to expedite consideration by the House, and preserve their Committee's jurisdiction in this area. On October 12, 1988, under suspension of the Rules, the House passed S. 1081, as reported by the Committee, by a roll call vote 311 ayes to 84 nays. On October 18, 1988, the Senate agreed to the House amendment in the nature of a substitute, clearing the bill for the President. On November 8, 1988, the bill was vetoed by the President. Committee Publication Number H. Rept. 100-1067, Part 1.

2.2—THE GEOLOGICAL SURVEY WATER RESOURCES ORGANIC ACT (H.R. 791/H.R. 3676)

To authorize the water resource research activities of the United States Geological Survey, and for other purposes.

Background and Summary of Legislation

Ground water currently provides nearly one-fourth of the nation's freshwater consumption. Nearly half of the nation's homes depend on ground water as a source of drinking water.

While the supply of ground water is vast, ground water is a vulnerable, finite resource that can be degraded by careless management. Incidents of ground water contamination by man-made toxic chemicals have raised concern about the quality of the nation's ground water resources. Since ground water moves slowly, concentrated plumes of contaminants spread slowly over the aquifer, lasting for decades or centuries. Clean up, even in the rare case where it is feasible, is highly expensive. In addition to the adverse health effects associated with contaminated ground water, communities face significant expense in providing water supplies from alternative sources.

Scientists, ground water experts, and public officials agree that our present knowledge about ground water contamination is inadequate and that an expanded research effort is necessary to provide the information needed to manage and protect ground water resources and to clean up contamination where it already exists. States simply do not have the resources to support comprehensive

ground water research, and witnesses, appearing before the Committee's Subcommittee on Natural Resources, Agriculture Research and Environment, agreed that the federal government is not doing enough to conduct research and assist state and local governments. Witnesses also expressed concern about the lack of coordination among the federal agencies conducting ground water research.

H.R. 791, as amended by the Committee, establishes a comprehensive and coordinated interagency Federal ground water research program. Section 5 requires the President to coordinate Federal ground water research programs by establishing an Interagency Ground Water Research Committee to be co-chaired by the U.S. Environmental Protection Agency (EPA) and the U.S. Geological Survey (USGS). Section 6 designates the USGS as the lead Federal agency for carrying out a national ground water assessment program, and section 7 designates the EPA as the lead agency for research and demonstration activities to assist State and local governments in managing ground water resources. Section 8 requires EPA to conduct risk assessment analyses for ground water contaminants. Section 9 authorizes EPA and USGS to provide technical assistance and training to States on ground water problems, and section 10 establishes a national ground water information clearinghouse. Section 11 contains several provisions to enhance EPA's internal capability to conduct ground water research, and section 12 requires research to be adequately peer-reviewed. The bill authorizes \$3 million in fiscal year 1988, \$6.3 million in fiscal year 1989, and \$9.9 million in fiscal year 1990 to the EPA for purposes of carrying out the Act.

Amendments adopted during House debate retained the substance of H.R. 791 as reported by the Committee, but included several new provisions relating to ground water contamination from agricultural nitrogen, a grant program for communities to remove radium from drinking water, several designated studies on ground water contamination, and higher authorization levels. These provisions had been reported by other committees with jurisdiction.

Legislative History

H.R. 791 was introduced on January 18, 1987, and referred to the Committee on Interior and Insular Affairs. On June 17, 1987, H.R. 791 was reported by the Committee on Interior and Insular Affairs and sequentially referred to four other Committees: Committee on Agriculture; Committee on Energy and Commerce; Committee on Public Works and Transportation; and Committee on Science, Space, and Technology, until September 30, 1987. On July 21, 1987, the Subcommittee on Natural Resources, Agriculture Research and Environment held hearings on H.R. 791, and a related bill, H.R. 2253. Testimony was received from Mr. Donald Ehreth, Environmental Protection Agency; Mr. Dallas Peck, U.S. Geological Survey; Mr. Erik D. Olson, National Wildlife Federation; Mr. Philip Metzger, The Conservation Foundation; Mr. Charles D. Malloch, Chemical Manufacturers Association; Mr. Jay Lehr, National Water Well Association; Mr. Mitchell Pally, the Long Island Association; Ms. Judy Campbell Bird, Environmental and Energy Study Institute; Dr. Craig Oliver and Dr. Mames C. Warman, National Association of State University and Land Grant Colleges; and Ms.

Roberta Savage, Association of State and Interstate Water Pollution Control Administrators.

On September 16, 1987, the Subcommittee considered and ordered H.R. 791 reported with an amendment in the nature of a substitute offered by Subcommittee Chairman Scheuer. The substitute amendment incorporated many of the provisions contained in a related bill, H.R. 2253, which had directed EPA to establish a ground water research program. The full Committee on Science, Space, and Technology considered and ordered H.R. 791 reported, as amended, on September 29, 1987. H. Rept. 100-155, Part 4, was filed in the House on September 30, 1987.

A bill incorporating a version of H.R. 791 agreed to by the five Committees with jurisdiction was introduced as H.R. 3676 on December 1, 1987. H.R. 791 was considered by the House on December 3, 1987. The House agreed to substitute the text of H.R. 3676 as an amendment in the nature of a substitute, and passed H.R. 791, as amended, by a vote of 399 yeas and 15 nays. The bill was referred to the Senate Committee on Environment and Public Works, which reported the bill on September 30, 1988. (S. Rept. 100-567). H.R. 791 passed the Senate, amended, on October 7, 1988. Committee Publication Numbers 100-59; H. Rept. 100-155, Part 4.

2.3—THE GROUND WATER RESEARCH, DEVELOPMENT AND DEMONSTRATION ACT (H.R. 2253)

To establish within the Environmental Protection Agency a comprehensive program of environmental research, development, and demonstration relating to ground water contamination and ground water resources.

Background and Summary of Legislation

H.R. 2253 establishes within the Environmental Protection Agency (EPA) a ground water research, development and demonstration program to assist State and local governments in protecting and managing their ground water resources. As introduced, the bill clarifies the EPA's authority to conduct ground water research to support State and local ground water needs, in addition to research which directly supports EPA's regulatory responsibilities under several environmental statutes. The bill also authorizes a demonstration program for promising new technologies which might detect, prevent, or clean-up ground water contamination.

Legislative History

H.R. 2253 was introduced by Subcommittee on Natural Resources Agriculture Research and Environment Chairman Scheuer and seven other cosponsors on April 20, 1987. The bill was referred jointly to the Committees on Energy and Commerce, and Science, Space, and Technology. On July 21, 1987, the Subcommittee on Natural Resources, Agriculture Research and Environment held hearings on H.R. 2253 and a related bill, H.R. 791. Testimony was received from Administration and public witnesses.

On September 16, 1987, the Subcommittee considered and ordered reported H.R. 2253 with an amendment in the nature of a substitute. The substitute incorporated provisions of H.R. 791,

which authorized a ground water research program at the U.S. Geological Survey. The Committee considered and ordered H.R. 2253 reported, as amended, on September 29, 1987. H.R. 2253 was superseded by H.R. 791. Committee Publication Number 199-59.

2.4—INVENTIONS IN SPACE (H.R. 1510)

To amend title 35, United States Code, and the National Aeronautics and Space Act of 1958, with respect to the use of inventions in outer space.

Background and Summary of Legislation

H.R. 1510 provides that inventions which occur in outer space on board U.S. space vehicles shall be treated, for patent purposes, as though these activities occurred within the United States. Specifically, the bill amends the patent law by adding a new section 105 to title 35, United States Code, to provide that an invention made, used, or sold on space vehicles under the jurisdiction of the United States, shall be deemed to have been made, used, or sold within the United States for application of U.S. patent laws.

Legislative History

H.R. 1510 was jointly referred to the Committees on the Judiciary, and Science, Space, and Technology on March 10, 1987. On April 8, 1987, the Committee on the Judiciary considered H.R. 1510; and reported it on April 9, 1987 (H. Rept. 100-51, Part I).

H.R. 1510, was referred to the Subcommittee on Space Science and Applications on March 12, 1987, which agreed to be discharged from further consideration on October 3, 1988. The Committee considered H.R. 1510 on October 3, 1988, and ordered it reported, without amendments (H. Rept. 100-51, Part II). H.R. 1510 passed the House, amended, under suspension of the Rules by voice vote on October 5, 1988. H.R. 1510 was received in the Senate, and on October 6, 1988, it was referred to the Senate Committee on the Judiciary. Committee Publication Number H. Rept. 100-51, Part II.

2.5—THE FEDERAL FIRE PREVENTION AND CONTROL ACT OF 1974 REAUTHORIZATION (H.R. 1522)

To authorize appropriations for activities under the Federal Fire Prevention and Control Act of 1974.

Background and Summary of Legislation

H.R. 1522 authorizes a total of \$16,698,000 in fiscal year 1988 for fire prevention education and technology development programs conducted at the U.S. Fire Administration (USFA) and firefighter training programs conducted at the National Fire Academy (NFA).

Legislative History

The Subcommittee on Science, Research and Technology held a hearing on hotel fire safety and the fiscal year 1988 authorization for the Federal Fire Prevention and Control Act on March 5, 1987. Fire safety experts from the U.S. Fire Administration, National Fire Academy, Center for Fire Research, fire service organizations, state government and Marriott Corporation, analyzed and made

recommendations on hotel fire safety in light of the DuPont Plaza Hotel fire of December 31, 1986, in which 96 people were killed.

On March 17, 1987, the Subcommittee to consider H.R. 1522, which had been introduced by Mr. Roe (by request; Executive Communication 100-725) on March 10, 1987. The bill was referred to the Committee on Science, Space, and Technology. During the Subcommittee markup, an amendment was adopted to overturn the Administration's proposals to eliminate all fire prevention and arson control activities at the U.S. Fire Administration and reduce by two-thirds the fighters' stipends for travel to the Fire Academy. The amendment restored the programs at the U.S. Fire Administration and National Fire Academy at the fiscal year 1987 appropriation level (\$16,698 million) and restored the Fire Prevention and Arson Control Activities and travel stipend program. By unanimous voice vote, the Subcommittee ordered H.R. 1522 forwarded to the Committee, with an amendment. On May 13, 1987, the Committee adopted the Subcommittee's recommendations by voice vote. The legislative report was filed in the House on May 21, 1987 (H. Rept. 100-103).

On June 8, 1987, H.R. 1522 passed the House under suspension of the Rules, as amended. H.R. 1522 was received in the Senate on June 9, 1987, and was referred to the Committee on Commerce, Science, and Transportation. Committee Publication Numbers 100-16; H. Rept. 100-103.

2.6—THE NATIONAL BUREAU OF STANDARDS AUTHORIZATION ACT FOR FY 1988 (H.R. 2160)

To authorize appropriations to the Secretary of Commerce for the programs of the National Bureau of Standards for fiscal year 1988, and for other purposes.

Background and Summary of Legislation

For fiscal year 1988, the Administration requested \$138.625 million for the National Bureau of Standards (NBS); \$1.900 million for the Office of Productivity, Technology and Innovation; and zero funding the National Information Service (NTIS).

The Committee approved an authorization bill, H.R. 2160, authorizing \$142.997 million for the National Bureau of Standards. This total includes all the initiatives proposed by the Administration for the Bureau, including \$3.550 million for process and quality control; \$1.500 million for high performance composites; \$750,000 for bioprocess engineering; \$500,000 for lightwave measurement technology (including fiber optics); \$500,000 for computerized reference data; and \$13.200 million in adjustments to base. The Committee did not accept the Administration's proposed decrease in funding for the Center for Building Technology and the Center for Fire Research and restored funding cuts of \$4.372 million for these safety programs with specific instructions that the two centers not be merged. A separate line item was established by the Committee for funding for the Cold Neutron Source Facility in the amount of \$6.500 million. The bill also includes exclusive authorization amounts of \$2.0 million for steel technology; \$7.371 million for the technical competence fund; \$3.710 million for the

Center for Building Technology; and \$5.662 million for the Center for Fire Research.

For FY 1988, the Committee authorized the sum of \$2.4 million for the Office of Productivity, Technology and Innovation (OPTI). The Administration has proposed a phasedown of OPTI for FY 1988. For the past few years, OMB has proposed the elimination or reduction of OPTI but, in each case, Congress has rejected that proposal in the belief that OPTI has provided valuable and needed services in this country's competitiveness effort.

For FY 1988, the Committee authorized the sum of \$500,000 for the patent licensing activities of the National Technical Information Service. Consistent with the Administration's privatization initiative, OMB proposed the contracting out of NTIS in its FY 1988 budget proposal, and directed the Department of Commerce to develop a plan to achieve that effort.

Legislative History

The Subcommittee on Science, Research and Technology held authorization hearings on March 3 and 4, 1987 on the proposed FY 1988 budget for NBS, OPTI, and NTIS, as well as the Administration's proposed plan to privatize NTIS.

As a result of recommendations received at the hearings and Subcommittee markup of a draft bill on April 9, 1987, H.R. 2160 was introduced on April 23, 1987 by Mr. Walgren and Mr. Boehlert. The Committee held a markup on May 13, 1987, and ordered the bill reported without amendments. The legislative report, H. Rept. 100-98, was filed in the House on May 19, 1987. H.R. 2160 passed the House on June 4, 1987, after agreeing to an amendment that ensures that the National Technical Information Service may procure quality printing services at the most cost-effective rate. On June 9, 1987, H.R. 2160 was received in the Senate and placed on the Senate calendar. On July 22, 1987, the measure was placed on the Senate Subjects on the Table calendar. On August 7, 1987, the language of H.R. 2160 was subsumed in the conference on H.R. 3, the Omnibus Trade and Competitiveness Act of 1988, which was vetoed by the President. August 23, 1988, provisions of H.R. 2160 became Sections 5111 through 5163 of H.R. 4848; the Omnibus Trade and Competitiveness Act of 1988, which became Public Law 100-418. H.R. 2160 was indefinitely postponed by the Senate. Committee Publication Numbers 100-3; 100-22; H. Rept. 100-98; P.L. 100-418.

2.7—THE NATIONAL SCIENCE FOUNDATION AUTHORIZATION ACT FOR FISCAL YEAR 1988 (H.R. 2330)

To authorize appropriations to the National Science Foundation for the fiscal year 1988, and for other purposes.

Summary and Background of Legislation

As part of its responsibilities, the Committee on Science, Space, and Technology annually acts on legislation to authorize the activities of the National Science Foundation (NSF). The Committee's legislative actions are based on the budget request for NSF submitted to the Congress by the President each year.

H.R. 2330 authorizes a total of \$1,893 million for NSF in fiscal year 1988. This authorization includes \$1,625 million for research and related activities under the following line items: biological, behavioral and social sciences; computer and information science and engineering; engineering; geosciences; mathematical and physical sciences; scientific, technological and international affairs; and program development and management. Also included is \$150 million for science and engineering education and \$118 million for the U.S. Antarctic Program.

The Committee-approved total authorization level in H.R. 2330 is identical to the Administration's request, but \$25 million is redirected from the U.S. Antarctic Program and a total of \$13.5 million from the Directorates for Mathematics and Physical Sciences; Engineering; Biological, Behavioral and Social Sciences; and Geosciences. Of the total of the \$38.5 million which was redirected, \$35 million was transferred to the Science and Engineering Education Directorate and \$3.5 million was transferred to the Computer and Information Science and Engineering Directorate.

H.R. 2330 includes the provision that, of the funds authorized, not less than \$48.5 million is authorized only for purposes of funding NSF Supercomputer Centers within the Computer and Information Science and Engineering Directorate. In addition, the bill states that not less than \$56 million is authorized only for purposes of Teacher Preparation and Enhancement activities (and of this amount \$42 million is directed for precollege Teacher Enhancement activities), not less than \$39 million is authorized only for purposes of Materials Development and Informal Science Education and not less than \$11.5 million is authorized only for purposes of the College Science Instrumentation Program, all within the Science and Engineering Education Directorate.

H.R. 2330 requires that 50 percent of all funds authorized for the Engineering directorate which are allocated for creating new Engineering Research Centers be used for Centers that focus on research relating to manufacturing technologies. Also, from that portion of the total authorization which NSF designates for establishing Science and Technology Centers, the bill requires that sufficient funds be set aside to create at least one Center dedicated to the development of model curriculum relevant to instruction in two-year and community colleges.

The bill would amend the National Science Foundation Act of 1950 by (1) removing the requirements that NSF fellowship award-ees take a loyalty oath and report on any past criminal record and (2) permitting the National Science Board to close to the public portions of Board meetings which are devoted to consideration of the NSF budget prior to its submittal to Congress. In other actions, H.R. 2330 encourages NSF to support improvements in research facilities at U.S. Marine biological laboratories and permits funds from any of the NSF Directorates to be used for unique advanced computing resources in support of research needs.

Finally, H.R. 2330 requires that reports on the following topics be provided to the Congress by NSF: (1) funds expended on undergraduate science and engineering education programs at NSF, (2) science and technology programs in two-year and community colleges, (3) the impact of salary levels on retention and recruitment

of precollege science and mathematics teachers, and (4) Soviet efforts to penetrate, utilize and compromise the products of the civilian science research programs of the United States.

Legislative History

H.R. 2330 was introduced by Mr. Walgren on May 7, 1987, and referred to the Committee on Science, Space, and Technology. This bill was the result of Subcommittee markup actions on H.R. 1155, which was passed by voice vote by the Subcommittee on Science, Research and Technology on April 9, 1987. Hearings were held on the Administration's FY 1988 authorization request for NSF (Title II of H.R. 1155) by the Subcommittee on Science, Research and Technology on February 19 and 25, and on March 11, 1987. In addition, a Committee posture hearing on NSF was held on March 24, 1987. The Committee ordered the bill, H.R. 2330, reported with amendments on May 20, 1987. On May 28, 1987, the legislative report was filed in the House (H. Rept. 100-110). The House passed H.R. 2330, as amended, on June 3, 1987, by the roll call vote of 408 ayes to 3 nays.

The bill was received in the Senate on June 5, 1987, and referred to the Committee on Labor and Human Resources. That Committee reported an original bill (S. 1632) to authorize appropriations for NSF for fiscal years 1988 through 1992 on August 7, 1987 (S. Rept. 100-148), and took no further action on H.R. 2330. Committee Publication Numbers 100-13; H. Rept. 100-110.

2.8—THE ENVIRONMENTAL RESEARCH, DEVELOPMENT, AND DEMONSTRATION AUTHORIZATION ACT OF 1987 (H.R. 2355)

To authorize appropriations for environmental research, development, and demonstration for the fiscal years 1988 and 1989, and for other purposes.

Background and Summary of Legislation

The Committee on Science, Space, and Technology authorizes the environmental research, development, and demonstration activities of the Environmental Protection Agency (EPA) as a means of ensuring that the program is well-managed and supportive of the Agency's primary role of protecting public health and welfare. In addition to providing authorization of appropriations, the research authorization bill provides substantive program direction to ensure that the Agency has an adequate scientific basis for its regulatory programs.

H.R. 2355 authorized program funds and provided program direction for fiscal years 1988 and 1989. This multi-year authorization was intended to promote stability and continuity in the Agency's research program which, given the nature of research, would enhance program quality.

As ordered reported, H.R. 2355 authorizes \$294,449,200 for fiscal year 1988 and \$307,109,400 for fiscal year 1989 for EPA research programs. Authorizations for Superfund research are not included because such programs were separately authorized for five years under the Superfund Amendments and Reauthorization Act. The total funds authorized for fiscal year 1988 are equal to the Presi-

dent's fiscal year 1988 request, which represents an \$11 million decrease from current fiscal year 1987 estimated levels. The total fiscal year 1989 authorization represents a 4.3 percent increase over the fiscal year 1988 level to account for inflation.

In addition to program authorization, H.R. 2355 contains provisions intended to provide guidance on EPA's research program, including a mandate for EPA to conduct and support long-term environmental research at the nation's universities in addition to conducting research for immediate regulatory needs; provisions expanding the role of the Science Advisory Board in providing evaluations of EPA's research programs to Congress; a requirement for EPA to conduct a detailed assessment of its scientific staffing needs; and direction to carry out several research studies, including research on air toxics in the Great Lakes region and new ways to reduce the generation of hazardous waste.

Legislative History

The Subcommittee on Natural Resources, Agriculture Research and Environment held hearings on the fiscal year 1988 EPA budget request for research and development on April 1, 1987. Administration and public witnesses testified concerning research needs, funding, and priorities.

In response to the hearings, a draft bill authorizing appropriations for EPA's research programs for fiscal years 1988 and 1989 was prepared and considered by the Subcommittee on May 7, 1987. At that meeting, the Subcommittee ordered a bill, reflecting its recommendations, to be introduced for consideration by the Committee. H.R. 2355 was introduced on May 8, 1987, by Subcommittee Chairman Scheuer. H.R. 2355 was considered and ordered reported, as amended, by the Committee on May 13, 1987. H. Rept. 100-111 was filed in the House on May 28, 1987. On June 4, 1987, the House passed H.R. 2355, amended, by voice vote. The bill was referred to the Senate Committee on Environment and Public Works. Committee Publication Numbers 100-54; H. Rept. 100-111.

2.9—THE TECHNOLOGY COMPETITIVENESS ACT OF 1987 (H.R. 2916)

To amend the National Bureau of Standards Organic Act of March 3, 1901, and the Stevenson-Wydler Technology Innovation Act of 1980 to further U.S. technological leadership, and for other purposes.

Summary and Background of Legislation

The purpose of the Technology Competitiveness Act of 1987 is to strengthen U.S. industry's competitive position in world markets by improving the ability of the Department of Commerce's technology and technology transfer programs to respond to the specific needs of small and medium-sized businesses, state and local government units that promote U.S. industry, and industries such as the semiconductor industry or steel industry which have been placed at a competitive disadvantage by foreign government practices. Each of the bill's titles either restructures or expands technology programs of the Department of Commerce or provides for the study or implementation of government-wide programs or policies which

have a major impact on the competitiveness of U.S. industry in world markets.

Title I is based on Congressman Brown's bill, H.R. 2165, the National Policy and Technology Foundation Act, and Congressman Ritter's bill, H.R. 2068, the National Bureau of Standards and Industrial Competitiveness Act of 1987. Title I establishes the National Institutes of Standards and Technology and the Advanced Technology Board. This title renames the National Bureau of Standards (NBS) as the National Institutes of Standards and Technology (NIST) and each of its four major operating units is designated as an Institute. The NBS Organic Act, enacted in 1901, is updated to reflect current programs being pursued at NBS, such as automated manufacturing, superconductivity, and biotechnology, which were not in existence when NBS was established. The title also establishes an Advanced Technology Foundation within NIST, which serves as a focal point for cooperation between the public and private sectors in the development of industrial technology. An Advanced Technology Board with broad representation from U.S. industry replaces the Visiting Committee as the statutory advisory committee for the Institutes. The sum of \$10 million is authorized for FY 1988 to carry out the new activities of NIST.

Title II is based on H.R. 2492, the Federal Industrial Extension Act, introduced by Congressmen Boehlert and MacKay. Title II requires a report by the Secretary of Commerce describing and evaluating current state industrial extension programs. The report is due on February 1, 1989, along with the Secretary's recommendation on how the Federal government could encourage state efforts. The title authorizes such sums as may be necessary for fiscal year 1988 to conduct the study and up to \$16 million per year in fiscal years 1989, 1990, and 1991 to implement programs to assist state industrial extension.

Title III is based on H.R. 2069, the Superconductivity Competition Act, introduced by Congressman Ritter. Title III requires the President to appoint a National Commission on Superconductivity to review major policy issues related to recent advances in superconductor research. A report by the Commission is required to be submitted to the President and the Congress within 6 months after enactment of the bill. The purpose of the study is to assist the Congress in devising a national strategy in superconducting technologies.

Title IV is based on H.R. 2219, the Competitiveness Enhancement Act of 1987, introduced by Representatives Schneider and Walgren, which establishes a Clearinghouse for State and Local Initiatives in the Office of Productivity, Technology, and Innovation. The Clearinghouse would collect and disseminate information of federal, state, and local technology initiatives. The cost of the program is \$.5 million in FY 1988, \$1 million in FY 1989, and \$1.5 million in FY 1990. An annual report to the Congress is required of the Secretary of Commerce.

Title V makes only minor changes in the text of H.R. 2191, the National Advisory Committee on Semiconductor Research and Development Act of 1987, introduced by Congressman Valentine. This title creates a 13-member independent advisory body known as the National Advisory Committee on Semiconductors to monitor the

semiconductor industry and recommend a national strategy to ensure U.S. competitiveness in the semiconductor industry. The main objective of this initiative is to reestablish U.S. leadership in semiconductor technology. Annual reports are required to be submitted to the President and the Congress on the Committee's activities. Such sums as necessary are authorized to be appropriated for fiscal years 1988, 1989, and 1990.

Title VI is based on H.R. 1964, the Metric Usage Act of 1987, introduced by Congressmen Brown and Ritter. Title VI establishes metric as the preferred system of measurement for United States trade and commerce and provides for use of the metric system of measurement in federal programs and procurements, where appropriate. It requires that each federal agency, to the extent feasible, begin operating in metric by 1992 while recognizing that exceptions or postponements of metric conversion may need to be made where an agency's conversion of a specific function or procurement to metric is likely to lead to significant loss of markets for U.S. firms or to cause significant inefficiencies.

Title VII makes three changes in the Stevenson-Wydler Act of 1990 as amended. Section 14(a)(4), dealing with the licensing of inventions, is reworded to permit the patent licensing program of the National Technical Information Service to receive, in a timely manner, the revenues it needs to continue its traditional program of providing worldwide patent licensing services to other government agencies. The Federal Laboratory Consortium's funding formula is adjusted to ensure that the organization receives the level of funding Congress intended for its responsibilities. Finally, the Office of Productivity, Technology, and Innovation of the Department of Commerce is required to study the concept of Competitiveness Impact Revenues and to report on its conclusions by September 30, 1988.

Legislative History

The Subcommittee on Science, Research and Technology held legislative hearings on April 28, 29, and 30, 1987, on the Role of Science and Technology in Competitiveness, including legislation introduced related to that issue. Legislation designed to revamp the organization of federal technology agencies, to promote the metric system, to develop a federal semiconductor policy, and to improve domestic technology transfer were all considered. Specifically, testimony was received on S. 907, the Technology Competitiveness Act of 1987, introduced by Senator Hollings; H.R. 2165, the National Policy and Technology Foundation Act of 1987, introduced by Mr. Brown of California; H.R. 2068, the National Bureau of Standards and Industrial Competitiveness Act of 1987, introduced by Mr. Ritter; H.R. 2164, the Department of Science and Technology Act of 1987, introduced by Mr. Brown of California; H.R. 1964, the Metric Usage Act of 1987, introduced by Mr. Brown of California; H.R. 2492, the Federal Industrial Extension Act of 1987, introduced by Mr. Boehlert and Mr. MacKay; H.R. 2219, the Competitiveness Enhancement Act of 1987, introduced by Miss Schneider and Mr. Walgren; and H.R. 2191, the National Advisory Committee on Semiconductor Research and Development Act of 1987, introduced by Mr. Valentine. H.R. 2069, the Superconductivity Competition Act of

1987, introduced by Mr. Ritter, was considered during committee hearings on superconductivity developments on June 10, 1987.

As a result of the hearings, H.R. 2916, the Technology Competitiveness Act of 1987, was developed and introduced on July 13, 1987 by Chairman Roe, with Representatives Walgren, Boehlert, Brown of California, Scheuer, Lloyd, Schneider, Glickman, Volkmer, Nelson of Florida, Hall of Texas, McCurdy, Mineta, Henry, Hamilton, Perkins, Price of North Carolina, Nagle, Skaggs, and Boucher as cosponsors, was referred to the Committee on Science, Space, and Technology, and subsequently to the Subcommittee on Science, Research and Technology. The Subcommittee considered H.R. 2916 on July 14, 1987, and forwarded its recommendations to the Committee for further consideration.

The bill was considered and ordered reported by the Committee on July 23, 1987, by voice vote, with an amendment in the nature of a substitute. The legislative report, H. Rept. 100-266, was filed in the House on August 4, 1987.

As reported, H.R. 2916 incorporates many provisions from the bills considered by the Committee and Subcommittee. The reported version includes the following: a revision of the text from H.R. 2492; the text as amended from H.R. 2191; a revised version of H.R. 2219; a revised version of H.R. 1964; and provisions from H.R. 2068, H.R. 2165, and H.R. 2069.

In many of its provisions, H.R. 2916 closely parallels S. 907, the Senate companion bill. S. 907 was introduced by Senators Hollings and Riegle on April 2, 1987, and was ordered reported by the Senate Commerce Committee on June 16, 1987. S. 907 was incorporated as Titles XLI through XLV of S. 1420, the Omnibus Trade and Competitiveness Act of 1987, which passed the Senate on July 21, 1987. On August 7, 1987, the language of H.R. 2916 was subsumed in Conference on H.R. 3, the Omnibus Trade and Competitiveness Act of 1988, which was vetoed by the President, but was enacted in H.R. 4848 as Title V, Subtitle B, Part I, becoming Public Law 100-418 on August 23, 1988. Committee Publication Numbers 100-22; H. Rept. 100-266; P.L. 100-418.

2.10—THE HOTEL AND MOTEL FIRE SAFETY ACT (H.R. 3704)

To amend the Federal Fire Prevention and Control Act of 1974 to direct the Director of the Federal Emergency Management Agency, acting through the Administrator of the United States Fire Administration, to propose and promulgate a model code and guidelines governing the use and installation of automatic sprinkler systems in places of public accommodation affecting commerce, and for other purposes.

Summary and Background of Legislation

The purpose of H.R. 3704 is to amend the Federal Fire Prevention and Control Act of 1974 to allow for the development and issuance of guidelines governing the use and installation of automatic sprinkler systems and smoke detectors in places of public accommodation affecting commerce.

December 3, 1987, Congressmen Walgren, Boehlert, and Lujan, Jr. introduced H.R. 3704, the Hotel and Motel Fire Safety Act of

1987. The bill was introduced as a result of a hearing the Subcommittee on Science, Research and Technology held on March 5, 1987, on the fire at the Dupont Plaza Hotel in San Juan, Puerto Rico, which claimed the lives of 97 people.

During the hearing the Subcommittee learned that about 12 minutes after the fire started, the occupants in the casino of the hotel were hopelessly trapped. A National Bureau of Standards (NBS) analysis of the Dupont fire revealed that a sprinkler system would have prevented this tragedy (NBSIR 87-3560).

Most fire safety experts agree that automatic sprinkler systems are the most effective and reliable on-site means of fire protection in a building. According to the National Fire Protection Association, there is no record of a multiple death fire (involving three or more people) in a completely sprinklered building where the system operated properly. Yet, even the most optimistic survey released by the American Hotel and Motel Association in June, 1988 showed fewer than half the hotel guest rooms in the U.S. were equipped with sprinkler systems. As of April 1988, only four states required sprinkler systems in all hotels.

H.R. 3704, as introduced, required the U.S. Fire Administration (USFA) to propose and promulgate a model code and guidelines governing the use of installation of automatic sprinkler systems in hotels within nine months of its enactment. Existing hotels were given up to seven years to comply with the requirements. States were given one year to incorporate USFA's model codes into their own codes. Firefighters from any state that did not comply with the USFA's model codes would be prohibited from attending the National Fire Academy (NFA).

Legislative History

H.R. 3704 was introduced by Mr. Walgren on December 3, 1987; it was referred to the Committee, where it was referred to the Subcommittee on Science, Research and Technology on December 8, 1987.

On March 2 and 10, 1988, the Subcommittee held hearings on the strengths and weaknesses of H.R. 3704, as introduced. As a result of the hearings, an amendment in the nature of a substitute was developed and adopted by the Subcommittee in its markup of the bill. The penalty inhibiting attendance at the National Fire Academy was removed, as were references to State codes. In lieu of the penalty, the amendment encouraged hotels to install smoke detectors and fire sprinklers by prohibiting federal employees from being reimbursed for lodging at hotels that lacked the equipment. By voice vote, the Subcommittee ordered H.R. 3704 forwarded to the committee with an amendment. April 21, 1988, the Committee by voice vote ordered H.R. 3704 reported with an amendment. Specifically, the amendment agreed to by the Committee would: give the U.S. Fire Administration 9 months (270 days) to issue guidelines for compliance by hotels to receive federal business (issuance of the guidelines would follow Federal Register procedures); require the guidelines to mandate smoke detection systems in all hotels and motels with five or more rooms and sprinklers in all hotels except those that meet all of the following criteria: two stories or lower, no interior corridors, immediate exterior egress from rooms

to a ground-level area; give states one year from the issuance of the final guidelines to prepare for the USFA a list of all hotels and motels in their state in compliance with the guidelines; prevent federal employees from receiving reimbursement if they stay at any hotel not on the list unless none is available within a reasonable distance, to be defined by the General Services Administration (GSA); empower the USFA to have the list updated periodically and to publicize the list. The bill would have no effect on state or local code writing for enforcement.

As ordered reported on April 21, 1988, by the Committee, H.R. 3704 contained a provision altering government travel reimbursement policy which was of direct interest to the Committee on Government Operations. Therefore, the Committee on Science, Space, and Technology held several discussions on the bill with the Government Operations Committee. The Committees agreed to a Floor amendment that eliminated the prohibition on reimbursement for lodging at a hotel or motel that failed to meet U.S. Fire Administration guidelines. Instead, the amendment requires that: (1) the Federal Travel Directory (which lists places of public accommodation that have agreed to charge government rates for federal employees, including civilian and military employees of the Department of Defense traveling on official Government business) list only hotels and motels that meet the specified fire safety guidelines; (2) the General Services Administration undertake discount negotiations only with the hotels that meet the specified fire safety guidelines; (3) that conferences and meetings funded by the Federal Government use only the approved hotels and motels listed in the Federal Travel Directory; and (4) the Directory include a description of special access and safety features each hotel and motel provides for guests who are hard of hearing, deaf, or are visually or physically handicapped. The remainder of the bill was unchanged from that reported by the Committee on Science, Space, and Technology. The bill was reported to the House, amended on September 22, 1988. (H. Rept. 100-956).

On September 26, 1988, the House suspended the Rules and passed H.R. 3704, as amended by voice vote. The bill was received by the Senate on September 29, 1988, where it was referred to the Committee on Commerce, Science, and Transportation. Committee Publication Numbers 100-16; 100-99; H. Rept. 100-956.

2.11—THE CONTROLLER PERFORMANCE RESEARCH ACT (H.R. 3779)

To direct the Administrator of the Federal Aviation Administration to conduct research into the consequences for the air traffic control system of automation of such system, and for other purposes.

Summary and Background of Legislation

The purpose of H.R. 3779 is to direct the Federal Aviation Administration (FAA) in coordination with the National Aeronautics and Space Administration (NASA), to study the effects of automation on the performance of traffic controllers and the air traffic control system.

The legislation arose from concerns voiced by FAA controllers over staffing allocations to FAA facilities. The facilities have had difficulty fielding an adequate number of trained controllers, in part because of the way FAA determines authorized staffing levels and allocates them to the field facilities, and in part because of the long training time between recruitment to full competence on the job.

Legislative History

H.R. 3779, was introduced by Mr. Buechner on December 17, 1987. The bill was referred solely to the Committee, and subsequently to the Subcommittee on Transportation, Aviation and Materials.

The Subcommittee conducted a hearing on June 16, 1988, on legislation dealing with aviation safety research, including H.R. 3779. At the hearing, FAA Administrator McArtor noted general agreement with the bill, and indicated that after introduction of the bill, FAA had assessed their ongoing programs to ensure that essential features of the bill were incorporated. Dr. Earl Wiener, a human factors expert from the University of Miami, indicated his agreement with the legislation, particularly as it could insure a level and continuity of effort which has been lacking in FAA in the past. The bill was ordered reported by the Subcommittee on June 29, 1988, by voice vote, as introduced.

On August 11, 1988, the Committee ordered H.R. 3779 reported by voice vote, without amendment. On September 20, 1988, it passed the House under suspension of the Rules. On September 22, 1988, the bill was referred to the Senate Committee on Commerce, Science, and Transportation.

Subsequently, the provisions of the Controller Performance Research Act became Title V of S. 2209, the National Aeronautics and Space Administration Authorization Act, 1989; and Section 8 of H.R. 4686, the Aviation Safety Research Act of 1988. Both H.R. 4686 and S. 2209 were enacted becoming P.L. 100-591 and P.L. 100-685, respectively. Committee Publication Numbers 100-109; H. Rept. 100-893; P.L. 100-591; P.L. 100-685.

2.12—THE BIOTECHNOLOGY SCIENCE COORDINATION AND COMPETITIVENESS ACT (H.R. 4502/S.1966)

To establish a national advisory commission to promote and coordinate scientific information and research on biotechnology, and for other purposes.

Background and Summary of Legislation

Biotechnology refers loosely to a group of genetic manipulations and procedures which enable scientists to produce precise alterations in the hereditary material of living organisms either to improve the organism itself as is the case with disease resistant tobacco, or to use the organism to produce a desired chemical substance, as is the case with bacterial cells which produce large quantities of Interferon.

The United States has been preeminent in this area of technology as a result of substantial Federal support for biomedical re-

search. Much of this technology has been transferred from federally supported laboratories at universities and research institutes to the private sector. According to a study by the Office of Technology Assessment, *U.S. Investment in Biotechnology*, the Federal government spent approximately \$2.7 billion on biotechnology research and development in FY 1987 compared with an investment of \$147 million on the part of 33 state governments.

Despite the considerable promise that biotechnology-based products hold for improving human health and environmental quality, the movement of these inventions from the laboratory to the marketplace has been hampered by an uncertain regulatory system. Much of the debate since the late 1970's has centered on the release of genetically-engineered organisms in the environment. The current challenge lies in developing policies to strengthen the U.S. position across the spectrum of biotechnology applications in accord with other national priorities such as environmental protection.

Although biotechnology has applications which span virtually all sectors of our economy, there is a growing sense among observers that the preeminent position of the U.S. in biotechnology may be eroded if steps are not taken to strengthen our national policy for this area of high technology. Many of the Nation's closest trading partners have singled out the field of biotechnology for special attention. These governments have formed partnerships with industry and universities specifically to target biotechnology research, development, and commercialization.

An area of biotechnology research which has been the focus of considerable attention is the human genome. Several groups, including the National Research Council, the Department of Energy Advisory Committee, the Howard Hughes Medical Institute and the Office of Technology Assessment, have recently released reports which concur in the importance of proceeding with a national research initiative in human genetics. The reports stress the importance of coordinating the national research effort on human genome research and the need for planning so that the collective efforts of many molecular genetics laboratories can be integrated into a set of useful research resources. While there is little disagreement with the notion of coordination, no actions have been taken to set up a formal coordination process between the Federal agencies involved in this research, particularly the Department of Energy (DOE) and the National Institutes of Health (NIH).

The Department of Energy, through its system of national laboratories, has a great deal of experience in managing large, multidisciplinary projects. The Department's particular strength is in technology development; in contrast NIH has traditionally supported basic scientific research. Both of these components are essential for a strong national genome research program.

As reported by the Committee, S. 1966 and H.R. 4502 contained several provisions to enhance the U.S. biotechnology industry's competitiveness. Title I of the bills established the *National Center for Biotechnology Information* at the National Library of Medicine. The purpose of the Center is to collect, store, and disseminate the results of biotechnology research by information systems and to support and enhance the development of new information technol-

ogies to facilitate the understanding of the processes that control health and disease.

Title II established a *National Biotechnology Policy Commission* for the purpose of developing a comprehensive strategy for maintaining our national position in this area of high technology. The Commission would be composed of representatives from the spectrum of interests involved with biotechnology research and development, including Federal agencies, the university research community, and representatives of the biotechnology industry, State biotechnology programs, and the public interest. The Commission will make recommendations to the President and Congress for a national strategy for coordinating biotechnology research and development in both the private and public sector.

Title III of the bill also established an Advisory Panel on the Human Genome and an Interagency Task Force on the Human Genome to promote a coordinated, federal interagency research program on mapping and sequencing the human genome.

Legislative History

H.R. 4502, the Biotechnology Science Coordination and Competitiveness Act of 1988, was introduced by Mr. Scheuer on April 29, 1988, and was jointly referred to the Committees on Science, Space, and Technology, and Energy and Commerce. On May 4, 1988, the bill was referred jointly to the Subcommittees on Natural Resources, Agriculture Research, and Environment, and Science, Research, and Technology.

S. 1966, the Biotechnology Competitiveness Act of 1987, passed the Senate by a roll call vote of 89 ayes to 1 nay on June 17, 1988. The bill was subsequently referred to the House Committees on Agriculture; Energy and Commerce; and Science, Space, and Technology.

On July 14, 1988, the Subcommittees on Natural Resources, Agriculture Research, and Environment, and Science, Research, and Technology jointly held hearings on H.R. 4502 and S. 1966. Testimony was received from Congressman Robert W. Kastenmeier; Dr. Kathi Hanna, Office of Technology Assessment; Dr. Bruce Merrifield, Assistant Secretary for Productivity, Technology and Innovation, Department of Commerce; Dr. Akihiro Yoshikawa, Biotechnology Project Coordinator, University of California, Berkeley, Berkeley Round Table on the International Economy; Dr. Robert Cook-Deegan, Office of Technology Assessment; Dr. Ruth Kirschstein, Director, Institute of General Medical Studies, National Institutes of Health; Dr. David B. Nelson, Executive Director, Office of Energy Research, U.S. Department of Energy; Mr. Richard Godown, Industrial Biotechnology Association; Dr. Bruce F. Mackler, Association of Biotechnology Companies; Ms. Anne Hollander, Conservation Foundation; Dr. Ralph W. F. Hardy, Boyce-Thompson Institute for Plant Sciences, Cornell University and BioTechnica International, Inc.

On August 2, 1988, the Subcommittee on Natural Resources, Agriculture Research, and Environment considered and ordered reported to the Committee for further consideration H.R. 4502 and S. 1966, after adopting an identical amendment in the nature of a substitute to each bill. On August 10, 1988, the Subcommittee on

Science, Research, and Technology considered and ordered reported to the Committee for further consideration of H.R. 4502 and S. 1966, after adopting an amendment in the nature of a substitute to each bill. H.R. 4502 and S. 1966 were considered and ordered reported, as amended, by the Committee on August 11, 1988. The legislative reports were filed in the House on September 28, 1988: H. Rept. 100-993, Part 1 (H.R. 4502); H. Rept. 100-992, Part 1 (S. 1966). Committee Publication Numbers H. Rept. 100-992, Part 1; H. Rept. 100-993, Part 1.

2.13—DEPARTMENT OF ENERGY CIVILIAN RESEARCH AND DEVELOPMENT
AUTHORIZATION FOR FISCAL YEAR 1989 (H.R. 4505)

To authorize appropriations to the Department of Energy for civilian research and development programs for fiscal year 1989.

Background and Summary of Legislation (Subcommittee on Energy Research and Development)

H.R. 4505 authorizes a total of \$3,591,766,000 in FY 1989 for Energy Research and Development programs conducted by the Department of Energy. This authorization includes \$3,177,200,000 for programs in Fossil Energy, Energy Conservation, Energy Supply Research and Development, Geothermal Resources Development fund, General Science and Research, and Isotope Reduction and Distribution fund. It also includes \$359,766,000 for Environmental Research and Development programs, and \$54,800,000 Transportation Research and Development programs.

Summary and Background of Legislation (Subcommittee on Natural Resources, Agriculture Research and Environment)

The Administration requested \$110 million in fiscal year 1989 to fund the Environment, Safety and Health Program, a 58 percent increase over the fiscal 1988 level. About half of the increase is for the nuclear safety program which performs reviews of Department of Energy (DOE) operations through, for example, Technical Safety Appraisals. The Environment, Safety and Health program has the responsibility to provide the Department of Energy with guidance on environment, safety, health and quality assurance policies, standards and compliance requirements. In addition the program is intended to assure that national environmental protection goals are incorporated into the formulation and implementation of energy programs and policy.

The Administration requested \$236.5 million for its Biological and Environmental Research program, an increase reflecting the need for additional resources in research on random, nuclear medicine, acid rain, sequencing the human genome.

Summary and Background of Legislation (Subcommittee on transportation, Aviation and Materials)

Transportation R&D

Within the Department of Energy Authorization, that part of the request for new obligational authority for FY 1989 that is under the jurisdiction of the Transportation, Aviation and Materials Subcommittee is \$28.4 million, which is \$23.4 million (45 percent) less

than the current amount appropriated for FY 1988 of \$51.8 million. Accordingly, the Subcommittee increased the amount for DOE Transportation Programs by \$23,418,000 to last year's appropriated level, making a total of \$51,800,000. The Subcommittee (1) increased Vehicle Propulsion R&D from the \$6.9 million requested to \$16.5 million; (2) increased the amount for Electric and Hybrid Vehicle R&D from \$5.6 million requested to \$9.5 million; (3) increased the amount for Alternative Fuels Utilization from \$1.6 million requested to \$4.2 million; (4) increased the amount for Advanced Materials Development from \$9.9 requested to \$14.5 million; (5) increased the amount for Technology Transfer & Assessment from \$.9 requested to \$1.7 million; (6) increased program direction from \$1.4 requested to \$2.3 million (7) added \$1 million for Capital Equipment.

Legislative History

The Department of Energy's FY 1989 budget request for Energy Research and Development programs was submitted to the House of Representatives on February 18, 1988, and subsequently referred to the Committee on Science, Space, and Technology. Three subcommittees have jurisdiction over the Department of Energy Civilian Energy Research and Development budget: the Subcommittee on Energy Research and Development; the Subcommittee on Natural Resources, Agriculture Research and Environment; and the Subcommittee on Transportation, Aviation, and Materials.

Numerous hearings were held on the various programs within the Department of Energy under the jurisdiction of the Subcommittee on Energy Research and Development. The hearings and the programs are described in detail in Chapter III of the Summary of Activities—100th Congress. The Subcommittee considered and marked up their programs on April 20, 1988, ordering a bill to be introduced reflecting their recommendations to the Committee for further consideration.

The Subcommittee on Natural Resources, Agriculture Research and Environment held a hearing on March 31, 1988 to consider the DOE budget request and the adequacy of efforts to strengthen the Environment, Safety and Health (ES&H) program. Garry W. Gibbs, Deputy Assistant Secretary for ES&H discussed the status of the Department's efforts to address specific environment and nuclear safety problems. The subcommittee also received testimony from John F. Ahearne, Chairman, DOE Advisory Committee on Nuclear Facility Safety; Keith O. Fultz, Associate Director, Resources, Community and Economic Development, General Accounting Office; Clyde C. Hopkins, President, Martin Marietta Energy Systems, Inc.; Robert Alvarez, Director, Nuclear Power and Weapons Program, Environmental Policy Institute. In addition, the Society of Nuclear Medicine and the American College of Nuclear Physicians provided testimony on the DOE Nuclear Medicine Research Program.

On April 26, 1988, the Subcommittee met and ordered a bill to be introduced reflecting its recommendations to the Committee for consideration. The Subcommittee recommended funding at the President's requested level.

A hearing was held by the Subcommittee on Transportation, Aviation and Materials on March 24, 1988, to receive testimony on the Department's authorization request for transportation R&D; the portion of the authorization within the jurisdiction of the Subcommittee was considered on April 27, 1988, and a bill was ordered to be introduced reflecting the Subcommittee recommendations for DOE's transportation programs for consideration by the Committee.

On April 29, 1988, the Committee began consideration of the Department of Energy budget request. H.R. 4505 was introduced on April 2, 1988. The Committee met again on May 5, 1988, to complete its markup of H.R. 4505. The Committee adopted a substitute to H.R. 4505, which: (1) restored Fossil Energy R&D and Conservation R&D programs to roughly FY 1988 levels; (2) included significant increases to the DOE request for Renewable Energy programs; (3) included significant enhancements of the Supporting Research and Technical Analysis program aimed at full utilization of the Department of Energy's unique facilities and construction of the new user facilities, support for university instrumentation and nuclear engineering, and support of thrusts in technological competitiveness; (4) included a significant increase to the Nuclear Fission R&D request to fund the Modular High-Temperature Gas Cooled Reactor at an aggressive level, to support the Fast-Flux Test Facility activities, the Strategic Technologies activities, and the Space Nuclear Reactor programs; (5) provided an additional \$25 million to the Magnetic Fusion Energy program; (6) enhanced the Operating Funds for Nuclear Physics; (7) provided funding for the Superconducting Super Collider project for FY 1989, and full construction funding in FY 1990 and FY 1991; (8) recommended a funding level in environmental Research and Development at the request level with redirection to fund two additional projects.

On June 3, 1988, H.R. 4505, as amended, passed the House by a roll call vote of 290 ayes to 27 nays, and was subsequently referred to the Senate Energy and Natural Resources Committee on June 7, 1988. It was reported with an amendment in nature of a substitute, which struck all the authorization text and replaced it with technology transfer provisions for the Department of Energy, as well as provisions for renewable energy research, and superconductivity research, by the Senate Energy and Commerce Committee September 26, 1988; and passed the Senate on October 21, 1988. Committee Publication Numbers 100-91; 100-101; 100-103; 100-117; H. Rept. 100-636.

2.14—THE NATIONAL LABORATORY COMPETITIVENESS ACT OF 1988 (H.R. 5132)

To amend the Federal Nonnuclear Energy Research and Development Act of 1974 to improve the transfer of technology or devices developed by the Department of Energy National Laboratories, and to improve interagency cooperation between the Department of Energy and other agencies with respect to technology transfer.

Background and Summary of Legislation

H.R. 5132 is legislation to improve the prospects of transferring new technology derived from basic and applied research and technology development at the Department of Energy's laboratories. A principal purpose of the bill, as amended by the Committee, is to address a significant problem of warehousing technologies developed at public expense at these laboratories. By promoting technology transfer from the Department of Energy's laboratories to the U.S. private sector, the Congress would enhance the ability of the U.S. industry to compete with foreign industries. The bill was initially referred to the Committee on Science, Space, and Technology. Upon filing the Committee report, the bill was sequentially referred to the Committees on Armed Services and the Judiciary.

H.R. 5132 would promote technology transfer by delegating to the laboratories new responsibilities in managing the technology transfer process. This would include responsibility for negotiating cooperative research and development agreements with universities, private industry and others, as appropriate. It would also include responsibility for finding potential licensees of technology. The bill would essentially apply existing technology transfer policies enacted in the Bayh-Dole Act (35 U.S.C. 200 et seq.) to all DOE laboratories and eliminate any inconsistencies perceived or real between such acts and the DOE's organic legislation.

Legislative History

On July 27, 1988, the Subcommittee convened a hearing on a draft of a bill, entitled the "National Laboratory Competitiveness Act of 1988." This bill was subsequently modified in response to the comments and on August 2, 1988, was introduced by Mrs. Lloyd, Chairman of the Subcommittee on Energy Research and Development, and 11 members of the Subcommittee. H.R. 5132 was solely referred to the Committee on Science, Space, and Technology on this date. On August 3, 1988, the Subcommittee on Energy Research and Development met for markup of the bill and forwarded it, without amendment to the Committee. On August 11, 1988, the Committee ordered the bill reported with an amendment. The report was subsequently prepared and the bill reported to the House on September 20, 1988 (H. Rept. 100-943, Part I).

On September 20, 1988, H.R. 5132 was sequentially referred to the Committees on Armed Services, and the Judiciary until October 7, 1988. This period was extended to October 12, 1988 and again to October 18, 1988. During this referral period a compromise vehicle was developed. On October 18, 1988, the other two committees were discharged from further consideration.

On October 21, 1988, the House passed a new version of H.R. 5132, as amended by Mrs. Lloyd, which called for a study of the technology transfer in the DOE and authorized a superconductivity initiative in the DOE, modeled on the SEMATECH initiative within the Department of Defense (DOD). In the Senate, H.R. 5132 was referred to the Committee on Energy and Natural Resources on October 21, 1988.

2.15—NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ATMOSPHERIC AND SATELLITE PROGRAM AUTHORIZATION ACT OF 1987 (S. 1667)

An original bill to authorize certain atmospheric and satellite programs and functions of the National Oceanic and Atmospheric Administration, and for other purposes.

Background and Summary of Legislation

The National Oceanic and Atmospheric Administration (NOAA) was created in 1970 to be the nation's primary oceanic and atmospheric research and services agency. NOAA has five components, three of which are under the jurisdiction of the Committee on Science, Space, and Technology: the National Weather Service; the National Environmental Satellite, Data and Information Service; and the Office of Oceanic and Atmospheric Research.

The National Weather Service (NWS) provides weather forecast information and alerts. Supporting research for NOAA programs is conducted through the Office of Ocean and Atmospheric Research (OAR). Ongoing studies include efforts related to climate research and forecasting, acid rain, ozone depletion research, greenhouse effect monitoring and research, and development of remote sensing equipment. The National Environmental Satellite, Data and Information Service (NESDIS) provides satellite remote sensing services for NOAA and the public.

S. 1667 authorizes appropriations of \$769,766,000 in FY 1988 and \$870,423,000 in FY 1989 for NOAA's Ocean and Atmospheric Research, the National Weather Service, and National Environmental Satellite, Data and Information Services.

Title I of the bill authorizes \$277,628,000 in FY 1988 and \$288,733,000 in FY 1989 for operations and research activities of the National Weather Service. It also authorizes \$84,000,000 in FY 1988 and \$132,000,000 in FY 1989 for the development, acquisition, and implementation of improvements in the forecast and warning systems of the National Weather Service.

Title II of the bill directs the Secretary of Commerce to submit to Congress a plan for the modernization of the National Weather Service and prohibits the closure or relocation of any Weather Service Office unless the Secretary has certified to Congress that such action will not result in any degradation of weather services provided to the affected area.

Title II authorizes \$40,521,000 in FY 1988 and \$42,142,000 in FY 1989 for climate and air quality research. It authorizes \$44,404,000 in FY 1988 and \$46,180,000 in FY 1989 for atmospheric research and services.

Title III also reauthorizes the National Climate Program and amends the National Climate Program Act to authorize studies on the impact of man's activities on global climate, and directs the Secretary of Commerce to submit to Congress a Climate Change Report every five years. Title III further directs the Secretary of Commerce to submit a plan to Congress for a world-wide system of ground-based systems to monitor chemicals which affect the stratospheric ozone layer.

Title IV of the bill authorizes \$298,326,000 in FY 1988 and \$334,685,000 in FY 1989 for NOAA satellite observations systems, including Landsat 4 and 5 operations, Landsat 7 technical requirements study, Geostationary Orbiting Environmental Satellite (GOES) systems and Polar Orbiting Environmental Satellite (POES) systems. Title IV further authorizes \$24,887,000 for FY 1988 and \$25,883,000 for FY 1989 for data and information services. This title also authorizes the Secretary of Commerce to assess user fees for access to environmental data archived by the National Environmental Satellite, Data, and Information Service.

Legislative History

S. 1667 was introduced August 12, 1987, and passed by the Senate on September 10, 1987. In the House, the bill was referred to the Committee on Science, Space and Technology, September 15, 1987, and then to the Subcommittee on Natural Resources, Agriculture Research and Environment on September 16, 1987.

The Subcommittee on Natural Resources, Agriculture Research and Environment held a hearing on the bill October 1, 1987. Witnesses at the hearing included Mr. J. Curtis Mack II, Acting Deputy Under Secretary for Oceans and Atmosphere, Department of Commerce; Professor George Benton, Department of Earth and Planetary Sciences, The John Hopkins University; Dr. Francis Bretherton, Visiting Professor, Space Science and Engineering Center, University of Wisconsin; and Professor Michael Fritsch, Department of Meteorology, Pennsylvania University. S. 1667 was forwarded to the Committee by the Subcommittee on October 8, 1987, with an amendment in the nature of a substitute.

The Committee on Science, Space and Technology ordered the bill reported October 15, 1987, amended (H. Rept. 100-406). S. 1667 passed the House on November 20, 1987, by a roll call vote of 341 ayes to 65 nays.

On August 9, 1988, the provisions of S. 1667 passed the Senate as Title II of S. 2209, the National Aeronautics and Space Administration Authorization Act, 1989; in S. 2209, as amended by the House on October 19, 1988, its provisions became Title IV. Ultimately, the provisions of S. 1667 were enacted as Title IV of P.L. 100-685, the National Aeronautics and Space Administration Authorization Act, 1989 on November 19, 1988. Committee Publication Number 100-61; H. Rept. 100-406; P.L. 100-685.

2.16—COMMITTEE RESOLUTION 100-1, SCIENCE ATTACHE RESOLUTION (H. CON. RES. 369)

On August 11, 1988, the Committee on Science, Space, and Technology adopted Committee Resolution 100-1, "to commend the Department of State's Science and Technology Officers on their outstanding performance and to recognize the importance of their work to the Congress and to the Nation." The Resolution was the culmination of meetings held by the Committee during 1987 and 1988 with the U.S. Department of State Science Attaches.

Subsequently, the Committee resolution was introduced in the House on September 22, 1988, by Chairman Roe, as H. Con. Res. 369. H. Con. Res. 369 was referred to the Committee on Foreign Af-

fairs, which ordered it reported on September 22, 1988. The resolution passed the House on September 26, 1988, and the Senate on October 19, 1988.

CHAPTER III—OVERSIGHT, INVESTIGATIONS AND OTHER ACTIVITIES OF
THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY, INCLUDING
SELECTED SUBCOMMITTEE LEGISLATIVE ACTIVITIES

3.1—COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

3.1(a)—Agency Posture Hearings

Agency posture hearings are held by the Committee each Congress. The purpose of the hearings is to place into the broadest perspective the research and development budgets of the individual agencies, and to describe and discuss the general, longer-term considerations which form the policy framework for the individual agency budgets within the jurisdiction of the Committee on Science, Space, and Technology.

During the 100th Congress, the following agency heads testified before the Committee:

January 28, 1987—Dr. William R. Graham, Science Advisor to the President and Director, Office of Science and Technology Policy, Executive Office of the President (Committee Publication Number 100-1);

February 5, 1987—Dr. James C. Fletcher, Administrator, National Aeronautics and Space Administration (Committee Publication Number 100-35);

March 17, 1987—Mr. John S. Herrington, Secretary, Department of Energy (Committee Publication Number 100-33);

March 24, 1987—Mr. Erich Bloch, Director, National Science Foundation (Committee Publication Number 100-13);

February 23, 1988—Dr. William R. Graham, Science Advisor to the President and Director, Office of Science and Technology Policy, Executive Office of the President (Committee Publication Number 100-81).

3.1(b)—Technology Policy Task Force

During the 100th Congress the Committee on Science, Space, and Technology initiated a study of technology policy as a major priority in carrying out its jurisdictional responsibility to Congress and the Nation.

At the beginning of the 100th Congress the Technology Policy Task Force was established, comprised of 18 Members of both political parties, to accomplish the study's goals.

During the First Session of the 100th Congress hearings were held by the Technology Policy Task Force on the following subjects: "Review of Previous Studies"; "Communications and Computers in the 21st Century"; "The Effects of Technological Change on the Labor Force"; "Cooperation in Industrial Research and Technology Development"; "The Commercial Development of Medical Biotechnology"; "Automobile Development and Production"; "Technology

and Economics in a Shrinking World"; and "Competitiveness and the Role of Large Corporations."

The study addressed factors that are crucial to achieving the national goal of economic strength through industrial and technological leadership. The study examined the role of the Federal Government in the advancement of technology, exploring those factors which directly and indirectly affect everything from original innovation to the achievement of commercialization.

The Second Session was devoted to developing and producing a policy statement and report. On October 13, 1988, the Committee adopted the report of the Technology Policy Task Force entitled, "Technology Policy and Its Effect on the National Economy" and the accompanying policy statement, "National Policy on Technology." The report included recommendations on policies that could represent a cohesive and consistent national approach in support of technology development and utilization for the nation. The report was filed in the House on October 19, 1988 (H. Rept. 100-1093). Committee Publication Numbers 100-24, 100-28, 100-29, 100-31, 100-32, 100-51, 100-64, 100-E, 100-F, 100-H, H. Rept. 100-1093.

3.1(c)—Committee Meetings With U.S. Department of State Science and Technology Officers

As part of a biennial professional development conference in Washington, D.C., the Department of State's science and technology diplomatic corps met for the first time this year with the Committee on Science, Space, and Technology. The meeting provided a forum for the science attaches to brief Members on the current pertinent situations in their respective assigned countries, and for Members to respond with their interests and concerns regarding international science and technology issues.

Country briefings by the 23 attaches included highlights of Brazilian and Argentine science and technology agreements with the U.S.; China's space program; the Toshiba diversion and Japan's handling of the situation; and the cancellation of Israel's Lavi fighter plane project. The in-country perspectives of these and other matters provided Committee Members with useful advice on international scientific cooperative matters, as well as an enhanced appreciation for the value of these scientific/diplomatic personnel to the interests of U.S. foreign policy.

The Chairman advised the diplomatic corps that international science and technology issues will continue to increase in importance to the U.S. and the Congress as the size of international science endeavors increase, requiring greater cooperation and cost-sharing; and that the ability of the U.S. to maintain industrial competitiveness will require effective monitoring of foreign technologies and creative sharing of technology with our allies.

Following the meeting with the Department of State Science and Technology Officers in 1987, the Committee urged the Department to convene its Washington, D.C. conference for this diplomatic corps on an annual, rather than biennial, basis. On September 28, 1988, as part of the second annual conference, the Committee met with 23 science attaches in an exchange of views on science and

technology activities and developments and on the overall political environment at home and abroad.

Chairman Roe opened the meeting with a summary of the Committee's international science and technology oversight for the year, including its concern for successful negotiations on the International Space Station and for an adequate and appropriate level of international participation in the Superconducting Super Collider. The Committee also conducted an oversight review of science and technology in South America, with an eye toward pursuing legislative options to strengthen our science and technology relationships there, and a review of European science and technology with the goal of planning ahead for the "European unification" in 1992, which may yield a new group of large-scale science projects.

The Department of State reviewed its activities in international science and technology in the past year, including: new personnel programs designed to enhance the Department's worldwide coverage of science and technology issues; efforts to improve technical information-gathering overseas; and efforts to incorporate intellectual property protection provisions into cooperative agreements.

The science attaches from selected countries (Japan, Korea, Indonesia, and the People's Republic of China) continued by discussing science and technology highlights in these countries. The discussion included a report on the status of negotiations for a U.S./China umbrella science and technology agreement and a separate space agreement with that country, and the role of technology and competitiveness in the relationship between the U.S. and Korea.

The Committee presented the science attaches with Committee Resolution 100-1 to commend them and acknowledge the importance of their work to the Congress. Chairman Roe introduced H. Con. Res. 369, which was similar to the Committee Resolution 100-1, on September 22, 1988. It was referred to and reported by the Committee on Foreign Affairs, on the same day. The House agreed to the resolution on September 26, 1988, and the Senate agreed to H. Con. Res. 369 on October 19, 1988.

3.1(d)—U.S.-Japan Inter-Parliamentary Meeting

On June 15-16, 1987, the Fifth Inter-Parliamentary Meeting was held between Members of the Science Committee and apposite Members of the Japanese Diet. The meetings have been held on a more or less annual basis since 1981. The purpose of the meeting was to exchange views and proposals on activities that could enhance U.S.-Japan Science and Technology cooperation.

Both sides emphasized the importance of pursuing a vigorous program of science and technology cooperation despite the current trade friction. The Japanese indicated that a new science policy had recently been developed by the Japanese Government which is intended to enhance basic research efforts and increase funding support, to increase contributions to international efforts, particularly in developing countries, and to increase translation of Japanese articles into English for publication in international journals.

Five agenda topics were discussed:

1. Life Sciences, including AIDS, biotechnology, and gene mapping;

2. Space Station and the National Aerospaceplane;
3. Earth Sciences, including Global Change, earthquake research and the El Nino;
4. R&D cooperation in high technology areas, including superconductivity and the Superconducting Super Collider (SSC); and
5. University Research, including access to Japanese facilities.

Progress was made in each of the discussion topics, with specific follow-on activities (e.g., international meetings, joint research efforts, agreement for further joint study) identified. At the conclusion of the meetings, the two Committees issued a joint press release summarizing the results of the discussions.

3.1(e)—The Flight of the Voyager

On February 3, 1987, the Committee conducted a hearing to pay tribute to and hear firsthand the experience of the Voyager crew, Jeana Yeager and Dick Rutan. They had flown a non-stop, unfueled, record breaking, around-the-world flight in a handbuilt, twin-engine, graphite composite and honeycomb structure with a slim 100.8-ft. high-aspect-ratio wing, aircraft. The nine-day flight was another epic chapter in World aviation history. Joining the Voyager crew for the hearing was Major General Leigh Wade, one of the three pilots who completed the U.S. Army's first around-the-World flight. Committee Publication Number 100-2.

3.1(f)—International Technology Transfer

Background

In January, 1987, findings by a National Academy of Sciences (NAS) Panel report on the "Impact of National Security Controls on International Technology Transfer" was leaked to the press, in advance of the release of the panel's final report, requiring an immediate Congressional review. The report cited a policy of overcontrol of high technology exports as exacerbating the trade deficit and threatening economic vitality. Specifically, the report asserted that too many items were being controlled, license application intervals were protracted, allied relations suffered and too many license denials were experienced by industry.

Summary of Hearings

Two hearings were held to review the report's findings. On February 4, 1987, General Lew Allen, chairman of the NAS panel, testified that multilateral control mechanisms such as CoCom must be strengthened. With the intent to enhance the manageability of the export control system, he recommended the U.S. reduce the number of items controlled and other licensing burdens such as re-export authorizations within CoCom. Finally, more efficient inter-agency conflict resolution was identified as a necessary administrative initiative to minimize license application intervals, especially in cases of foreign availability.

On April 23, 1987, Mr. Richard Perle, Assistant Secretary of Defense for International Security Policy, testified that he believed

U.S. industry was most concerned with the time it takes to acquire a license. He recommended that items which are no longer strategic be removed from the control list; however, he warned against removal by means of arbitrarily-determined legislative thresholds. He further stated that licensing intervals could be substantially reduced by the addition of greater automation and technical support at the Department of Commerce. He, too, felt that CoCom should be strengthened and recommended that Congress provide leverage for the U.S. in dealing with non-U.S. CoCom companies which fail to maintain the intent of CoCom controls. Finally, mechanisms facilitating international scientific cooperation were identified as areas requiring further attention, coincident with the advent of U.S. big science initiatives. Committee Publication Number 100-12.

3.1(g)—NASA's Response to the Committee's Investigation of the Challenger Accident

In the 99th Congress, following the space shuttle "Challenger" accident which occurred on January 28, 1986, the Committee, under the direction of the Committee's present Chairman Robert A. Roe, conducted an extensive investigation of the accident in accordance with its oversight responsibilities. The investigation culminated in a report, "Investigation of the Challenger Accident" (H. Rept. 99-1016), wherein the National Aeronautics and Space Administration (NASA) was requested to respond to the Committee's findings and recommendations.

Since that time NASA has undertaken a large number of activities which are designed to strengthen the agency and to ensure that the Space Shuttle program and NASA are on a comprehensive course that will provide a return to safe flight. In its response of February 15, 1987, to the Committee report, the NASA stated: "A large amount of work is involved in implementing the specific Recommendations of the Committee and of the Rogers Commission. NASA agrees with, and is implementing, each of the Committee Recommendations."

On February 26, 1987, the Committee convened to receive NASA's responses to the Committee's investigation of the "Challenger" accident. Dr. James C. Fletcher, Administrator, as the lead witness, summarized the agency's efforts: (1) initiation of a System Design Review of all program flight hardware, software, and ground support equipment, to establish those items requiring redesign, analysis, or testing prior to first flight; (2) teams were formed for solid rocket booster redesign; (3) evaluation of failure modes and effects analysis/critical items list; (4) landing safety; (5) launch and launch aborts; (6) crew escape mechanisms; (7) flight rate and maintenance safeguards; (8) and actions were taken to strengthen NASA management and communications and the safety, reliability, and quality assurance program. Testifying with Dr. Fletcher were: Mr. Dale Myers, Deputy Administrator, Admiral Richard Truly, Associate Administrator, Office of Space Flight, Mr. Arnold D. Aldrich, Director, Space Shuttle Program, and Mr. Thomas Utsman, Member, NASA Task Team.

The Committee is committed to and actively continuing its oversight of NASA's progress in maintaining a robust Space Shuttle

Program dedicated to operating safely and reliably. Committee Publication Number 100-7.

3.1(h)—Superconductivity

Background

Recent discoveries of new, high temperature, superconducting materials open the way to potentially revolutionary changes in communication, transportation and energy use. The new materials, complex ceramics of copper and rare-earth oxides, exhibit superconductivity at temperatures well above that of liquid nitrogen, a plentiful and inexpensive coolant. Expectations are that even higher temperatures are likely. News of the new material has generated renewed efforts in Japan, China, Europe and elsewhere, to understand and apply the new materials.

Summary of Hearings

On June 10, 1987, the Committee on Science, Space and Technology conducted a hearing to focus on the current status of the new superconductors and their application to a wide range of technologies, including supercomputers, energy generation and transmission, and advanced magnet design for basic research and potential transportation and medical use. In addition, the hearing explored the Federal Government's efforts to incorporate the discovery of these new materials into current and future programs, particularly as they may effect economic competitiveness.

A number of key points or conclusions emerged from the hearing: (1) In order to take advantage of the new superconducting materials, a close collaboration between industry and government must exist or be created. (2) Creation of new institutions is not necessary; the need is to bring together in some creative fashion those that now exist. "Coordination" is key. (3) There is a need to establish clear priorities and goals in specific areas of application. (4) Federal efforts need to focus on manufacturing and process engineering and science while maintaining strong efforts in the fundamental understanding of these materials. (5) Funding for basic R&D seems healthy, at least for the moment; on the other hand, funding support for applications needs additional consideration. (6) Estimated costs of a national, federal program plan were between \$500 million to \$750 million over a five-year period. Committee Publication Number 100-69.

3.1(i)—The University Research Facilities Revitalization Act of 1987 (H.R. 1905)

To assist in revitalizing the Nation's academic research programs by authorizing a ten-year matching grant program in the National Science Foundation for the repair, renovation, or replacement of laboratories and other research facilities at universities and colleges.

Background

Leaders in academia, government, and industry believe we must modernize our academic laboratories and research facilities, where

much of the pioneering work of American science is performed. The current state of disrepair diminishes the ability of academic scientists to conduct research and limits student education. Both of these factors reduce our nation's competitive strength in the world marketplace.

Summary of the Hearing

The Committee on Science, Space, and Technology held a hearing on the issue of academic research facilities and H.R. 1905 on June 25, 1987. The purpose of the hearing was to explore various funding mechanisms for modernizing academic research facilities. The Committee asked witnesses to provide an assessment of the funding approach embodied in H.R. 1905. The witnesses included a wide variety of institutions and researchers: Mr. Erich Bloch, Director of the National Science Foundation; Dr. John Silber, President of Boston University; Father Frank Haig, President of LeMoyne College; Dr. Stephen Muller, President of Johns Hopkins University; Dr. M. Richard Rose, President of Rochester Institute of Technology; Dr. Herman Blake, President of Tougaloo College; Dr. Luther Williams, President of Atlanta University; Sister Jean O'Laughlin, President of Barry University; Dr. Barry Bloom, President of the Federation of American Societies of Experimental Biology; Dr. Sheila Widnall, President of the American Association for the Advancement of Science; Dr. Glenn Stevens, Executive Director of the President's Council of Michigan Colleges and Universities; Dr. David Goodman, Deputy Director of the New Jersey Commission on Science and Technology; Dr. Thomas Nicholson, Director of the American Museum of Natural History; Mr. John Pratt, President-Elect of the Association of Independent Research Institutes; and Dr. Joseph Saloom, Chairman of the Council on Research and Technology. In addition, several statements were submitted by other interested parties. This hearing continued the Committee's legislative activities on academic research facilities which was successfully legislated during the 100th Congress (See P.L. 100-418, Sec. 1.9, and P.L. 100-570, Sec. 1.13). Committee Publication Number 100-55.

3.1(j)—Review of the Results of the 1987 Antarctic Expedition To Study Ozone Depletion

Background

A hearing was held by the Committee on October 29, 1987, on the Results of the Antarctic Ozone Expedition. It had been observed from ground observations and satellite data that a systematic reduction in stratospheric ozone was occurring over the Antarctic during the Southern Hemisphere Spring season. These observations may provide significant insight into the chemical and dynamic processes that control stratospheric ozone. This may also suggest the potency of man-made chemicals such as chlorofluorocarbons in depleting the natural protective ozone layers.

The following witnesses testified at the hearing: Ambassador John D. Negroponte, Assistant Secretary for Oceans and International Environmental and Scientific Affairs, Department of State; Mr. A. James Barnes, Deputy Administrator, Environmental Pro-

tection Agency; Dr. Robert T. Watson, Chief, Upper Atmosphere Research Program, NASA; Dr. Adrian Tuck, Aeronomy Lab, NOAA; Dr. Robert Corell, Assistant Director for Geosciences, NSF, who was accompanied by Dr. Peter E. Wilkniss, Director, Polar Programs, NSF.

Focus of the Hearing

The hearing reviewed the scientific results of the 1987 expedition, examined inter-agency and international roles in cooperative efforts, reviewed tentative conclusions reached on the causes of global and Antarctic ozone depletion, and discussed ways in which new information can be factored into existing international protocols and policies. Committee Publication Number 100-77.

3.1(k)—The Superconducting Super Collider (SSC)

The Committee conducted three days of hearings during April, 1987, to address the scientific benefits and implications for other scientific activities, of the Administration's proposal for the Superconducting Super Collider (SSC), a projected \$6 billion, major, new scientific initiative in particle physics, that had been announced in February, 1987.

The SSC project will require construction of a 52-mile racetrack-like tunnel housing nearly 10,000 superconducting magnets to accelerate and focus two beams of protons. These beams will collide with each other at energies of 10 trillion electron volts each from opposite directions. The beam collisions at various locations along the racetrack are expected to produce new particles and new knowledge about the fundamental nature of matter.

Testimony was received from witnesses representing the general science community as well as high energy physicists; the international scientific community; foreign and domestic high technology industries; Members of Congress; and State governments. Committee Publication Number 100-80.

3.1(l)—U.S.-Poland Joint Commission on Science and Technology

On June 30, 1988, the Committee on Science, Space, and Technology met with a seven-person Polish delegation, including four Commissioners from the U.S./Polish Joint Commission on Science and Technology, to discuss implementation of the U.S./Polish Science and Technology agreement signed in September 1987. The focus of the meeting was on both the overall U.S./Polish Science and Technology relationship and funding levels for the agreement.

The agreement, signed by Vice President Bush in September 1987, renews a previous relationship with Poland which was allowed to expire in 1981 following imposition of martial law and outlawing of the Solidarity movement. The new agreement provides for the establishment of a Joint Commission for the purposes of planning, coordinating, facilitating, and reviewing science and technology cooperation and its financing. Cooperative projects under the agreement will likely focus on medical sciences, basic research, engineering, agriculture, coal research, transportation, and the environment. The agreement contains extensive language on protection of intellectual property rights.

The agreement calls for equal funding from both sides. The Congress recently concluded its deliberations on the Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriation Bill, 1989 (Public Law 100-459), and the Report language indicates the Administration may seek funding for the Poland program through reprogramming procedures.

3.1(m)—Meeting With Italian Senate Committee on Industry, Commerce, and Tourism

On September 14, 1988, the Committee on Science, Space, and Technology met with members of the Committee on Industry, Commerce, and Tourism of the Senate of the Republic of Italy as part of the delegation's fact-finding mission to examine advanced industrial technologies, joint ventures for research and development, and the use of venture capital for emerging technologies in industry. Discussions centered on enhancing Italy's role in the U.S. Superconducting Super Collider Project, the critical relationship of technology to economic growth, the status of research on commercial applications for renewable energy and other alternate energy sources, and the impact of Public Law 100-418, the Omnibus Trade and Competitiveness Act.

3.1(n)—Meeting With Italian Chamber of Deputies Committee on Environment, Interior, and Public Works

On September 22, 1988, the Committee on Science, Space, and Technology met with members of the Committee on Environment, Interior, and Public Works of the Chamber of Deputies of the Republic of Italy. The delegation of 13 members visited the U.S. to study environmental protection and management programs. Discussions focused on municipal waste disposal and recycling, ocean and ground water pollution, global climate change, acid rain, and hydrographic basin management.

The United States and Italy share a number of concerns and problems related to water resource contamination and environmental pollution. Surface ground water contamination is one of those; it is all the more disturbing to Italy because of the threat to cultural and artistic treasures. Other problems include ocean dumping, the toxic effects of nutrient enrichment and chemical contamination on productive estuaries and lakes, and municipal waste problems which are forcing us to look into new recycling and resource recovery technologies.

The Committee described a number of measures the U.S. has taken or is considering to alleviate the pressures of these types of problems: ratifying Annex V of the International Convention for the Prevention of Pollution from ships; strengthening the Clean Water Act to address non-point source contamination for the first time; moving legislation through this Committee and the House which would establish a new coordinated federal research and technical assistance program to help state and local officials manage and protect their ground water resources; and signing the Montreal Protocol on Substances that Deplete the Ozone.

The Italian delegation's mission visited Tennessee Valley Authority (TVA) assets throughout the Tennessee Valley region; as

the Italian government is planning the creation of a similar governmental authority to address water and natural resource management problems in Italy. Congresswoman Marilyn Lloyd (D-Tennessee) briefed the delegation on the role of the TVA and its accomplishments.

3.1(o)—Implications of the Licensing Decision on the Chinese Long March Launch Vehicle

In September 1988, the Administration notified Congress that it intended to approve export licenses to a U.S. satellite manufacturing company for the launch of two of its satellites, which had been ordered by an Australian telecommunications group, AUSSAT, on the Chinese Long March launch vehicle.

The Administration also decided to approve a license for the launch of a third U.S.-made satellite on the Chinese Long March. This satellite, known as AsiaSat, was retrieved by the Space Shuttle in 1984, and will be launched on behalf of a Hong Kong-based consortium of British and Chinese ownership. In both cases, issuance of these licenses would be subject both to COCOM approval and to the following conditions:

1. The U.S. and the People's Republic of China (PRC) will establish a government-to-government agreement to safeguard the technology from possible misuse or diversion;
2. The U.S. and the PRC will reach agreement establishing the liability responsibilities of the Chinese government; and
3. The U.S. and the PRC will reach an agreement to prevent possible unfair Chinese pricing or trade practices relating to launch competition.

The Committee on Science, Space, and Technology examined this issue in two days of extensive hearings on September 23 and 27, 1988, involving government witnesses, the principal private parties directly involved in the licensing decision, outside experts on China, and representatives of American launch and satellite industries.

Although several Members of the Committee were concerned that approval of the licenses would undercut the nascent U.S. commercial launch industry, the hearings clearly established the fact that the Long March licensing issue has implications that go well beyond the short-term impact of rocket contract awards, including the entire U.S./China relationship in high-technology trade—an area of utmost importance to both countries.

U.S./China trade has grown to over \$10 billion in 1987, which places the U.S. as China's third largest trading partner. Over 300 American countries have invested in China with total commitments now approaching \$3 billion. The enormous potential presented by an expanded presence of U.S. commercial interests in the Pacific Rim benefits our national interests as well as our balance of trade.

On September 30, 1988, the House, during consideration of H.R. 4781, the Department of Defense Appropriations bill, by the roll call vote of 234 ayes to 23 nays, to reject an amendment that would have jeopardized the three Long March licenses.

3.2—SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT

During the 100th Congress the Subcommittee on Investigations and Oversight participated in a number of hearings held by the Committee and other Subcommittees:

3.2(a)—Hearings by the Committee on Science, Space, and Technology

H.R. 1905, the University Facilities Revitalization Act [Chapter III, Sec. 3.1(i)].

NASA's Response to the Committee's Report on the "Investigation of the Challenger Accident" [Chapter III, Sec. 3.1(g)].

3.2(b)—Hearings by the Subcommittee on Science, Research and Technology

Federal Information Policy Mechanisms: H.R. 2159, the National Technical Information Act of 1987, and H.R. 1615, a bill to establish the government Information Agency [Chapter III, Sec. 3.5(a)].

3.2(c)—A Hearing by the Technology Policy Task Force

Competitiveness and the Role of Large Corporations.

3.2(d)—The Subcommittee Participated With Other Subcommittees in Developing the Following Legislation

H.R. 1905, the Universities Research Facilities Revitalization Act of 1987;

Subconference 17 on H.R. 3, Trade and International Economic Policy Reform Act of 1987, regarding semiconductor manufacturing technology development;

H.R. 2159, the National Technical Information Act of 1987; and H.R. 2492, the Federal Industrial Extension Act of 1987.

3.2(e)—The Subcommittee Conducted Investigations Into the Following Matters

Biotechnology experiments in Argentina and New Zealand;
Conflicts of interest within the National Science Foundation;
Science fraud in Federally-funded intra- or extra-mural research;
Computer software safety, reliability, and regulation; and
Security planning, management, and operations at NASA facilities.

3.2(f)—Impact of the Ammonium Perchlorate Plant Explosion in Henderson, Nevada

Background

On May 4, 1988, hundreds of workers fled for their lives as the Pacific Engineering and Production (PEPCON) plant in Henderson, Nevada disappeared in a series of explosions. Two people died and hundreds were injured. The PEPCON plant was one of only two domestic plants producing ammonium perchlorate—an oxidizer vital to the production of solid rocket motors used in the space program and the defense arsenals of the United States and her allies.

Hearings

The Subcommittee on Investigations and Oversight held two hearings in June of 1988 to examine issues resulting from the PEPCON explosion. The first hearing was held in Washington, D.C., on June 8, 1988, to address problems of ammonium perchlorate allocation in the explosion's aftermath. The second hearing was held in Henderson, Nevada, on June 24, 1988, to examine the local impact of the explosion.

The Subcommittee hearing on June 8th addressed the issue of how to allocate the remaining ammonium perchlorate among U.S. and foreign users and how to restore sufficient ammonium perchlorate production capacity. Witnesses for the hearing included Admiral Richard H. Truly, Associate Administrator for Space Flight, NASA; Mr. Daniel S. Rak, Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy) Department of Defense; Mr. Courtney Stadd, Director, Office of Space Transportation, Department of Transportation; and Mr. John Richards, Director of Office of Industrial Resources Administration, International Trade Administration, Department of Commerce.

Admiral Truly discussed the impact the explosion could have on NASA's anticipated schedule of Space Shuttle flights. Mr. Rak described the workings of the ammonium perchlorate advisory group which was making preliminary allocation decisions and planning for resumption of ammonium perchlorate production at a new facility. Mr. Stadd addressed the needs of the commercial launch industry and the effect shortage of ammonium perchlorate could have on that industry's future. Mr. Richards discussed the workings of the Defense Production Act and its application to the distribution of ammonium perchlorate if a shortage should develop.

On June 24, 1988, the Subcommittee held a field hearing in Henderson, Nevada, to review the local impact of the PEPCON plant explosion. The Governor and Lieutenant Governor of Nevada testified regarding the explosion's effect on the State of Nevada as well as efforts underway to assist the citizenry in their recovery efforts. Federal officials from NASA and the Air Force testified regarding the recovery effort underway and the plans to allocate ammonium perchlorate until a new production plant was available. Officials from the Federal Emergency Management Agency (FEMA) testified regarding FEMA's efforts to assess the blast's damage and FEMA's decision not to grant disaster status to the area. Local officials testified regarding losses suffered in the community as well the efforts underway to prevent similar occurrences in the future. Representatives of PEPCON and Kerr-McGee testified regarding their respective operations, practices and plans for the future.

The witnesses included Hon. James Bilbray (D-Nev.); Hon. Richard Bryan, Governor; Hon. Richard Miller, Lieutenant Governor; Rear Adm. Richard H. Truly, Associate Administrator for Office of Space Flight, NASA; Mr. Daniel S. Rak, Deputy Assistant Secretary of the Air Force (Acquisition Management and Policy); Hon. Gary Bloomquist, City Manager accompanied by Mr. John Finney, Director of Emergency; Mr. John Pappageore, Deputy Chief, Clark County Fire Department; Mr. Grant Peterson, Associate Director, State and Local Programs and Mr. Dennis Kwiatkowski, Assistant

Associate Director, Disaster Program, FEMA; Mr. Fred Gibson, PEPCON and Mr. George Hennigan, Kerr-McGee. In addition to those witnesses, several local citizens attending the hearing were invited to testify regarding their personal experiences of the explosion and the losses they suffered therefrom.

During the hearing, FEMA officials testified that Henderson residents suffered approximately \$290,000 of uninsured losses from the PEPCON explosion. At the suggestion of Chairman Roe, Kerr-McGee worked with Committee staff to establish a loan guarantee program for Henderson residents up to the full amount of the losses documented by FEMA. Implementation of the program helped repair several homes in the area and kept a number of businesses in operation. Committee Publication Number 100-130.

3.2(g)—The Cutting Edge: Science and Technology for America's Future

The Subcommittee met in Bethlehem, Pennsylvania, on June 27, 1988, at the request of the Hon. Don Ritter (R-Pa) to discuss progress in, and Federal support for, research in superconductivity, photonics, factory automation and industrial product quality.

Background

A principal focus of the Committee's activities in the 100th Congress has been the promotion of American industrial competitiveness. New developments in at least three areas—superconductivity, photonics, and robotics—have created new economic battlegrounds.

The discovery of new ceramic superconducting materials created an intense interest among Committee Members eager to see U.S. firms best their global competitors in marketing products using these new materials. Similarly, the development of photonics—a technology employing light, rather than electricity, as a means for transferring information—has revolutionized telecommunications and consumer electronics. Fiberoptic cables, compact disc players and optical discs are only the beginning of the photonics legacy.

In the area of robotics, U.S. manufacturers have begun to install new automated machine tools in their production facilities on a large scale. The goal is to create an integrated factory system that can reduce the time needed to respond to changing trends in the marketplace. These new technologies significantly improve product quality and, in turn, manufacturing competitiveness.

Hearing Summary

The Subcommittee received testimony from the following witnesses: Mr. Sam Kramer, Deputy Director of the National Engineering Laboratory of the National Institutes of Standards and Technology (NIST); Dr. Roger Nagel, Professor of Manufacturing Systems Engineering at Lehigh University; Mr. Francis Jackson, Director of Quality Management for the Eastman Chemical Division, Eastman Kodak Company; and Mr. Ed Alkire, Director of Quality and Safety for the Industrial Gas Division of Air Products and Chemicals, Inc.

Further witnesses included Dr. Kay Rhyne, Program Manager for Ceramics and Superconductivity at the Defense Advanced Re-

search Projects Agency (DARPA), Department of Defense; Dr. Michael Notis, Lehigh University Professor of Materials Science and Engineering; Dr. Lawrence Goldberg, Director of the National Science Foundation Quantum Electronics, Waves and Beams Program; and Dr. Melvyn Dixon, Department Head at the AT&T Bell Laboratories.

The hearing's first panel focused on improving American manufacturing and product quality. Dr. Nagel argued for better coordination of Federal contributions to manufacturing technology research. He suggested that this coordination could be supplied by the Department of Defense, the National Science Foundation or the National Institutes for Standards and Technology (formerly the National Bureau of Standards). Dr. Kramer described for the Subcommittee the new Advanced Manufacturing Research Facility, a testbed for new manufacturing technologies constructed at the National Engineering Laboratory. The facility will attempt to assist industry in overcoming inefficiencies in new production systems before they are widely introduced into operational factories.

Testimony from Mr. Jackson and Mr. Alkire described the slow progress being made in demonstrating the competitive benefits created by close attention to quality in products and services. Mr. Jackson pointed out that the United States only recently began following statistical quality control processes certain Americans had taught the Japanese immediately after World War II. Both witnesses emphasized the changes in the relationship between managers and workers needed to extract the full benefits of this changed perspective about quality.

Witnesses on the second panel discussed Government and university projects for the study of the newly-discovered ceramic superconducting materials. The DARPA program managed by Dr. Rhyne is attempting to fund a number of small-scale startup projects to gain experience with the processes necessary for the fabrication of these materials. Dr. Notis described for the Subcommittee the efforts underway to use these new materials in wires, a more useful form for commercial applications. Both witnesses stressed the need for a focused and coordinated program drawing on contributions from Federal and state governments, industry and universities. Dr. Notis felt that the program described in the Committee's legislation, H.R. 3048 (Chapter I, Sec. 1.20), was a promising start.

The Chairman then directed the discussion to the science policy issues the panelists had raised. The Members explored topics such as inconsistency in Federal science policy, the competition for funds between scientific research and other Federal programs, and the inability of Congress to maintain steady and level research funding. Dr. Notis drew a number of comparisons between the consensual model for research support practiced by Japan and the more decentralized and entrepreneurial model employed in the United States, indicating that success was more likely to be achieved using the former as a guide.

Dr. Dixon opened the panel on photonics by urging that the Federal Government provide a market for new products employing these technologies. He felt this might be a more useful policy than direct financial subsidies for research and development, given the budget deficit. Military requirements for secure communication

systems was one area specifically highlighted in his testimony. Dr. Dixon also requested Federal assistance in the assurance of a worldwide free market for photonic technologies and the prevention of "dumping" in the U.S. market by overseas manufacturers. The National Science Foundation, according to Dr. Goldberg, has a three-part research effort underway in the Engineering Directorate examining basic research in lightwave control, new photoelectronic integrated circuits and applications of photonic technologies in information storage and management. Dr. Goldberg was careful to point out that these efforts could not by themselves guarantee American competitiveness in this field and argued that the Foundation's efforts required support from other, more specialized, agencies.

Dr. Dixon pointed out that photonics is now beginning to reap the benefits from twenty years of research and development, and pointed to the parallels with the situation facing the infant field of superconductivity. Dr. Goldberg highlighted the Japanese focus on the commercial marketplace as a principal reason for their success in applying photonics in consumer technologies. Committee Publication Number 100-131.

3.2(h)—Space Shuttle Software Investigation

At a hearing of the Subcommittee on Space Science Applications on January 27, 1988, (Chapter III, Sec. 3.6[i]) Mr. Nagle brought to the Members' attention an article in Time magazine (Time, Feb. 1, 1988) regarding allegations of safety lapses in the production of software for the space shuttle. At the hearing a formal review of the allegations was pledged.

At the Chairman's request, the Investigations and Oversight Subcommittee staff reviewed volumes of NASA and contractor documents related to the production and testing of flight software and met with NASA and contractor software engineers and officials. The staff also interviewed National Aeronautics and Space Administration (NASA) staff and contractor employees, including Mrs. Sylvia Robins of Houston, Texas, whose allegations had been the subject of the Time magazine article.

As a result of the review the Subcommittee learned that Mrs. Robins was raising serious concerns related to the operation of the Space Transportation System Operations Contract (STSOC), especially in the area of independent verification and validation of the software. Chairman Roe and Mr. Lujan wrote Dr. James Fletcher, NASA Administrator, and insisted that NASA increase the level of independent validation and verification in the software production and testing process.

NASA initiated a four million dollar effort through Intermetrics, Inc.—a Seattle-based company that has been reviewing software development for NASA. Under this assignment, Intermetrics has expanded its role to include a complete review of the software production and testing process. Intermetrics is also involved in the flight readiness review process, and has the responsibility of filing a certification of flight readiness. Intermetrics has provided the Committee with the detailed report it prepared for NASA prior to approving the flight of the space shuttle "Discovery."

3.3—SUBCOMMITTEE ON NATURAL RESOURCES, AGRICULTURE RESEARCH AND ENVIRONMENT

3.3(a)—Stratospheric Ozone Depletion

Background

The chemical composition of the atmosphere is changing as a result of human activities. One of the most significant changes is the rapid increase in atmospheric concentrations of chlorofluorocarbons, or "CFCs". CFCs are stable, non-toxic chemicals with a wide variety of uses, including refrigeration equipment, styrofoam, solvents and aerosols.

In addition to concerns that CFCs, as greenhouse gases, contribute to global warming, since 1974 scientists have theorized that CFCs could migrate to the stratosphere, starting a string of chemical reactions that would destroy stratospheric ozone. If ozone in the stratosphere were reduced, greater amounts of ultraviolet-B radiation from the sun would reach the earth's surface, causing a likely increase in human skin cancers, potential disruption of the aquatic food chain, and possible crop and forest losses.

Given the natural annual variability of stratospheric ozone, it has been difficult to determine whether global stratospheric ozone levels have already declined. Discrepancies between ground-based and satellite-based ozone monitoring devices also make it difficult to draw firm conclusions.

Despite continuing uncertainties about the validity of projections made by complex computer models, in recent months a consensus has emerged that significant ozone depletion would concur within fifty to seventy years if CFC emissions continue to grow. Concern has also been fueled by the 1985 discovery of significant seasonal ozone depletion in the stratosphere above Antarctica. While the causes of such depletion are not certain, many scientists believe that CFCs are involved.

Federal efforts to understand stratospheric ozone depletion have been led by the National Oceanic and Atmospheric Administration (NOAA), the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Environmental Protection Agency (EPA). There is no concern that a more coordinated federal interagency research effort may be necessary as the ozone depletion issue grows in scope and urgency.

Late in 1987, the U.S. signed an international protocol in Montreal to cut consumption and production of CFCs by 50 percent of 1986 levels by 1999. The Montreal Protocol also calls for a scientific, economic, and technological assessment beginning in 1990 and at least every four years thereafter. In December, 1987, the U.S. proposed restrictions on domestic production and use of CFCs to implement the Montreal Protocol.

Hearings

The Subcommittee held hearings on stratospheric ozone depletion on March 10 and 12, 1987. The testimony on the first day addressed the state of the scientific research with respect to global and Antarctic ozone depletion and the research efforts of the various federal agencies addressing the issue.

Testimony was heard from Dr. F. Sherwood Rowland, University of California at Irvine, one of the original authors of the theory that CFCs destroyed stratospheric ozone. Dr. Rowland testified that there was strong evidence supporting a decline in average global ozone consistent with the chemical theories. He also stated his belief that CFCs were associated with the seasonal ozone depletion in Antarctica, and cautioned that the existence of the Antarctic ozone hole, which had not been predicted by any model, underscored the uncertainties in our present understanding. Given the importance of the resource at risk, Dr. Rowland argued for policies to reduce quickly emissions of ozone-depleting substances.

The Subcommittee also heard from Dr. Susan Solomon from NOAA, who led an interagency expedition to Antarctica in 1987 to research Antarctic ozone depletion. Dr. Solomon described the expedition, the present hypotheses of the cause of the depletion, and the need for further research.

Testimony was also heard from representatives of the federal agencies conducting ozone-related research, including Dr. Daniel Albritton (NOAA), Dr. Robert Watson (NASA), Dr. Jarvis Moyers (NSF), Mr. John Hoffman (EPA), and Mr. James Falco (EPA). The witnesses testified that the existing, informal coordination of the agencies on the global and Antarctic ozone depletion issue was excellent and that more formal coordination requirements were unnecessary. The witnesses did indicate that a lack of funding was hampering research efforts, particularly with respect to travel. The witnesses noted that the Antarctica expedition was possible only because the Chemical Manufacturers Association paid for the travel expenses of agency scientists.

On March 12, 1987, the Subcommittee held a second day of hearings examining the relationship between the scientific understanding of ozone depletion and domestic and international policies. The Subcommittee heard from the Honorable Richard Benedick, Deputy Assistant Secretary, Department of State, and Mr. Craig Potter, Assistant Administrator, U.S. EPA, on the status of international negotiations and possible domestic regulations to restrict CFC use. The Subcommittee also heard testimony from Mr. Richard Barnett, Alliance for a Responsible CFC Policy, Mr. Robert Orfeo, Chemical Manufacturers Association, Mr. David Doniger, Natural Resources Defense Council, and Dr. Irving Mintzer, World Resources Institute. The industry representatives discussed the uncertainties in the science relating to ozone depletion, but also supported restrictions on future CFC growth. Mr. Doniger and Dr. Mintzer supported immediate international and domestic reductions in CFC emissions. Committee Publication Number 100-53.

3.3(b)—Oversight of the FY 1988 Budget Request for Department of Energy Biological and Environmental Research

On March 19, 1987, the Subcommittee held hearings on the fiscal year 1988 budget request for the Biological and Environmental Research program of the Department of Energy (DOE).

Dr. Alvin Trivelpiece, Director of the Office of Energy Research and Charles DeLisi, Associate Director, Office of Health and Environmental Research, testified on the Department's commitment to

a strong scientific program on the effect of radiation on human health. The FY 1988 budget request specified funding for two major initiatives related to the development and safe use of energy technologies: a proposal to decode the human genome and an expanded effort in the area of radon research.

Leroy Hood, California Institute of Technology, provided testimony on the desirability of launching a national research initiative to map and sequence the human genome. This will lead to a fuller understanding of the human genetic profile and will aid scientists in diagnosing and treating a variety of illnesses. In his testimony, Paul H. Silverman, Lawrence Berkeley Laboratory, related that this undertaking was a natural extension of the Department's interest in human biology.

Donald F. Grether, Lawrence Berkeley Laboratory, provided testimony on the Department's research into the effects of radon radiation on human health. Roger O. McClellan, Inhalation Toxicology Research Institute, discussed the current state of scientific knowledge concerning the dangers of radon exposure and what remains to be done in this regard.

The Subcommittee held further hearings on March 25, 1987, to consider the progress of DOE's Office of Environment, Safety and Health in executing initiatives for improved environmental safety and health oversight and to determine whether more rigorous oversight is necessary to ensure environmentally safe operation of DOE facilities.

Mary L. Walker, Assistant Secretary, Environment, Safety and Health, told the Members that the Environmental Surveys designed to evaluate health and safety conditions in 40 contractor-operated facilities around the nation were underway. When these surveys are completed, DOE will begin to set priorities for the clean-up activity required under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Keith O. Fultz, Carl Bannerman and William Fenzel of the General Accounting Office (GAO) described the findings of several years of investigations into the Department's health and safety activities. GAO maintains that although an inventory of the problems existing at DOE facilities is essential, the Department has sufficient information to undertake immediate remedial action at several sites. It was recommended that a DOE-independent review committee be established to provide oversight of the Department's nuclear defense facilities. In addition, GAO recommended that the Office of the Assistant Secretary for Environment, Safety and Health, which was established by Secretary John Herrington in late 1985, be legislatively mandated by Congress.

On April 23, 1987, the Subcommittee held a hearing to examine DOE's program on Nuclear Medicine including research priorities and the adequacy of the FY 1988 budget request.

The field of nuclear medicine was developed largely at DOE laboratories where there is ready access to accelerators, reactor by-products (i.e., isotopes and sub-atomic particles), skilled personnel and long-term funding. This technology offers a non-invasive alternative for monitoring body functions, diagnosing and isolating the

causes of diseases and identifying anatomic and physiologic abnormalities in ways that were previously not possible.

Howard J. Dworkin and Alfred P. Wolf, representing the Society of Nuclear Medicine, provided testimony on the advantages of nuclear medicine-based procedures over conventional diagnostic protocols. They described the important role DOE has had in supporting basic research and development of the clinical applications of nuclear technology. Urging that the Members consider increasing by 10% the authorization level for this activity, the Society's testimony said that nuclear medicine-based procedures lead to improved patient care and ultimately reduce consumer health care expenses, making this activity one of the most efficient investments of federal research dollars.

David Goldenberg of the Center for Molecular Medicine at the University of Medicine and Dentistry—New Jersey testified on the use of radio-labeled antibodies in the detection and treatment of certain forms of cancer.

A plan to convert a reactor at the Idaho National Engineering Laboratory (INEL) to a nuclear medicine facility which would provide boron-neutron capture therapy for patients suffering with a malignant brain tumor known as glioblastoma was presented by John H. Spickard, INEL, Patrick Gavin, Washington State University, Ronald Dorn III, Mountain States Tumor Institute and Stephen Marano, Eastern Idaho Regional Medical Center.

The future of nuclear magnetic imaging technologies and their usefulness in detecting a variety of conditions including cardiovascular abnormalities were discussed by Gerald M. Pohost, Center of Nuclear Imaging Research at the University of Alabama at Birmingham and Paul C. Lauterbur, College of Medicine at the University of Illinois at Urbana-Champaign.

On the basis of these hearings and briefings by Department officials, the Subcommittee forwarded its recommendations to the Committee on May 7, 1987. The Subcommittee supported the Administration's overall budget request of \$288,000 million while making some adjustments to individual programs. Committee Publication Number 100-58.

3.3(c)—The Future of the Landsat System

Background

The United States pioneered the use of satellites to conduct remote sensing of the Earth's surface to locate mineral deposits, and monitor the health of crops and water resources. In 1984, Congress passed legislation that provided for a phased transition of land remote sensing to the private sector after the demise of the final government satellite (expected to occur about 1988). The legislation provided for a government subsidy of \$250 million to enable the private-sector firm (EOSAT) to maintain an operational capability until the development of the Nation's first new space industry since the advent of space communications in the 1960's. However, funding for the Landsat subsidy has been imperiled since the inception of this effort and has been further complicated by the loss of the space shuttle "Challenger." Thus, the viability of Landsat commercialization is not clear.

Hearings

On March 31, 1987, and April 2, 1987, the Subcommittee on Natural Resources, Agriculture Research and Environment and the Subcommittee on International Scientific Cooperation held oversight hearings on the Future of the Landsat System. The hearings examined the costs of continuing the Landsat system; the uses and users of Landsat; what the Nation loses without a U.S. presence in multi-spectral remote sensing; levels of technology necessary for Landsat 6 and Landsat 7 to compete effectively in the international arena; prospects for successful commercialization of Landsat; and prospects for increased international cooperation in remote sensing.

Witnesses at the hearings included Senator Larry Pressler; Joseph Wright, Deputy Director, Office of Management and Budget; Clarence Brown, Deputy Secretary of Commerce, Department of Commerce; Anthony Calio, NOAA Administrator; Donald Latham, Assistant Secretary for Command, Control, Communications and Intelligence, Department of Defense; Peter M. P. Norris, Executive Vice President, EOSAT; Warren Nichols, Director, Hughes Santa Barbara Research Center; Charles Schmidt, Vice President and General Manager, GE-RCA Astro-Space Division; Dr. Shelby Tilford, Director, Earth Science and Applications Division, NASA; Micheal A. G. Michaud, Deputy Assistant Secretary for Science and Technology Affairs, Department of State; Doyle Frederick, Associate Director, U.S. Geological Survey; James Donald, Chairman, World Outlook Board, Department of Agriculture; Dr. Frederick Henderson, President, GEOSAT Committee; Harry Stewart, Sun Exploration Corporation; Samuel McCandless, Jr., User System, Inc.; Dr. Thomas Lillesand, University of Wisconsin; David Julyan, SPOT Image Corporation; Mark Brender, ABC-TV News; Gregory Koeln, Ducks Unlimited; Dr. James Taranik, Dean, MacKay School of Mines; James McCarthy, Harvard University; Charles Sheffield, Earthsat Corporation; and Dr. John McElroy, Hughes Communications, Inc. Committee Publication Number 100-4.

3.3(d)—The Conservation of Biological Diversity

Background

Biological diversity refers to the variety and variability among living organisms and the ecological complexity in which they occur. The escalating global trend towards human modification of natural areas has made it necessary to undertake measures aimed at preserving biological resources.

Ecological problems have little to do with national boundaries. In a world linked by commerce, communications and politics, the suggestion that ecological problems can be solved on the local level is unrealistic. Most losses in diversity are the unintended consequences of human activity. In less developed countries, the loss of biological resources are due to the combined pressures of population growth and poor agricultural practices. Rapid and unintended reductions in biological diversity undermine economic development

since the end result is the elimination of untapped resources for agricultural, industrial and pharmaceutical development.

Hearings

The Subcommittee held hearings on May 28, 1987, to consider the report, "Technologies to Maintain Biological Diversity" which had been prepared for the Subcommittee by the Office of Technology Assessment. Susan Shen, Director of the OTA study, provided the Subcommittee with an overview of the global trend towards the loss of biological resources.

Mark Plotkin, World Wildlife Fund/Conservation Foundation and Professor Garrison Wilkes, University of Massachusetts, described the economic importance of preserving diversity. Plant-derived drugs account for an \$8 billion dollar market in the U.S. alone. In addition, wild relatives of agriculturally important plants (most of which are not native to North America) contain characteristics which are used to strengthen the crop strains upon which we rely. Professor Bryan Norton, New College of the University of South Florida, provided testimony on the ethical and esthetic considerations involved in preserving and maintaining biological diversity.

Peter S. Ashton, Director, Harvard Arnold Arboretum, and Warren Thomas, Director, Los Angeles Zoo testified on *ex situ* remedies for preserving diversity. William Gregg, Co-Chairman of Man in the Biosphere Directorate, National Park Service, described U.S. participation in the United Nations Man in the Biosphere program which seeks to integrate the aims of development with preservation of natural resources.

Since the consensus of these witnesses was that the U.S. lacked a comprehensive approach to arrest the loss of biological diversity, a second hearing was held on September 22, 1987, to consider critical elements in developing a national conservation strategy for biological resources. Although various laws and programs of Federal, State and private organizations already provide the framework for a concerted and comprehensive approach, few of these programs have as their explicit aim the protection and maintenance of biological diversity. The lack of coordination among programs has resulted in duplication of efforts, conflicts in goals and gaps in geographic and taxonomic coverage.

Testimony presented by the following witnesses provided the Members with a framework for developing legislation to address this issue: Kenton Miller, Director-General, International Union for the Conservation of Nature and Natural Resources; Robert Hoffman, Director, National Museum of Natural History, The Smithsonian Institution; John Buffington, Deputy Regional Director for Research, Fish and Wildlife Service; William Penn Mott, Director, National Park Service; Dale Robertson, Chief, U.S. Forest Service; Robert Jenkins, Vice-President for Science, The Nature Conservancy; Michael Bean, Director of Wildlife Program, Environmental Defense Fund; George Davis, Past-President, American Association for Systematics Collections; and Michael Soule, President, Society for Conservation Biology. Committee Publication Number 100-70.

3.3(e)—Global Climate Change and Climate Act Reauthorization

Background

The National Climate Program Act of 1978 set up five-year program plans for global climate data collection, monitoring, and research in a number of government agencies, including the Departments of Agriculture, Commerce, Defense, Energy, Interior, State and Transportation; the Environmental Protection Agency; NASA; the Council on Environmental Quality; the National Science Foundation; and the Office of Science and Technology Policy. In 1986, the Consolidated Omnibus Budget Reconciliation Act amended the Climate Program Act by establishing a "Climate Program Policy Board" reporting to the Secretary of Commerce, requiring the Board to review each agency's climate program and requiring an update of the National Climate Plan every four years.

In the decade since the passage of the National Climate Program Act, concerns about potential changes in global climate have greatly increased. Carbon dioxide, the most abundant greenhouse gas, continues to increase due to rising fossil fuel consumption. Trace gases have been found to have an additive effect to carbon dioxide in potential greenhouse warming. An "ozone hole" has been observed in the Antarctic which may be attributable to industrial CFC's destroying stratospheric ozone. Numerical climate models have indicated that a doubling of greenhouse gases could lead to a four degree warming of the Earth and modifications in global moisture patterns resulting in major changes in viable agriculture areas. Regional weather events have indicated that changes in seasonal weather patterns can cause a significant economic impact on major areas of the world.

Hearings

On July 22 and 23, 1987, the Subcommittee held hearings on the National Climate Act and Global Climate Change Program. The purpose of the hearings were to: determine the predicted 50- to 100-year change in the atmosphere and oceans due to natural and human-induced change, and the measurements required to document these changes; determine the impact of global climate change on agriculture, transportation, and the economy, and the probability of structuring national and international policy to ameliorate the negative impacts of global change; review the status and future of the National Climate Program; and review current global change programs to consider the need for additional climate and global change legislation.

Witnesses at the hearings included Dr. Stephen Schneider, Director, Natural Systems Group, National Center for Atmospheric Research; Dr. Jerry Mahlman, Director, Geophysical Fluid Dynamics Lab, NOAA; Prof. Wallace Broecker, Lamont Doherty Geophysical Observatory; Dr. George Woodwell, Director, Woods Hole Research Center; Dr. Michael Giantz, Director, Environmental and Societal Impacts Group, NCAR; Dr. Norman Rosenberg, Resources for the Future; Dr. Charles Weiss, University of Pennsylvania; Dr. Irving Mintzer, World Resources Institute; Prof. Tom Wigley, Director, Climate Research Unit, University of East Anglia, Norwich, England; Dr. Dan Albritton, Director, Aeronomy Lab, NOAA; Dr.

Francis Bretherton, Senior Scientist, National Center for Atmospheric Research (NCAR); Dr. Alan Hecht, Director, National Climate Program Office, NOAA; Prof. Werner Baum, Dean, College of Arts and Sciences, Florida State University; Dr. Stan Changnon, Chief, Climate and Meteorology Section, Illinois State Water Survey; and Dr. Eugene Bierly, Director, Division of Atmospheric Sciences, National Science Foundation.

On September 30, 1987, the Subcommittee on Natural Resources, Agriculture Research and Environment also held joint hearings with the Subcommittee on International Scientific Cooperation on Global Climate change. For more information, see the section on activities of the Subcommittee on International Scientific Cooperation [Chapter III, Section 3.7(e)]. Committee Publication Number 100-73.

3.3(f)—Opportunities for International Scientific Cooperation to Control AIDS

Background

Cases of Acquired Immune Deficiency Syndrome (AIDS) have been reported in individuals in 120 of the 159 countries of the world. The World Health Organization (WHO) has estimated that as many as 10 million persons worldwide are infected with Human Immunodeficiency Virus (HIV), the etiologic agent of AIDS. Statistics for this global epidemic are generally unreliable since no country has undertaken a study to determine the extent to which its population has been exposed to the virus. However, scientists agree that the critical figures are those which refer to the number of persons exposed to HIV rather than the number of cases of AIDS. The current number of AIDS cases reflects the level of infection present five or more years ago, while the current number of persons testing positive for exposure to HIV indicates the future magnitude of the problem. The global nature of the epidemic requires that scientific research be undertaken throughout the world to study variations in the nature and transmission of the virus.

Hearing

The Subcommittee held a hearing on September 17, 1987 to consider the role of the United States in international efforts to prevent and control the spread of the disease, including the impact of the epidemic on foreign policy and the opportunities for research collaborations, which exist for U.S. scientists in both developing and developed countries.

The testimony provided by Roy Widdus, Director of International Health for the Institute of Medicine, was based on the Institute's report, "Confronting AIDS." Dr. Widdus stressed the importance of mounting a national effort to assess and coordinate the roles and responses of the various Federal agencies, private voluntary groups and foundations involved in AIDS research as a first step towards a global response.

Jonathan Mann, Director of the World Health Organization (WHO) program on AIDS, addressed the role of the WHO in coordinating international medical efforts for AIDS. Dr. Mann explained that the enormous financial demand that this epidemic has placed

on WHO resources is exacerbated by the fact that the U.S. has been delinquent in its contribution to the WHO's budget.

Roland St. John, Coordinator of the Health Situation and Trend Assessment Program of the Pan American Health Organization, described the public health problem as well as research needs and opportunities which exist in the developing countries of the Americas.

Bradshaw Langmaid, Chairman of the U.S. Agency for International Development's task force on AIDS, presented testimony on the status of U.S. support of international scientific research efforts.

Dace Stone, Johns Hopkins University Population Information program, highlighted public education programs undertaken by several countries to control the spread of infection. Ms. Stone indicated that the family planning educational networks in place throughout the world would be the most efficient way to disseminate reliable public health information to control the spread of the disease. Committee Publication Number 100-65.

3.3(g)—Groundwater Resources in Albuquerque, New Mexico

Background

The South Valley of the City of Albuquerque has experienced significant ground water contamination problems for a number of years. In February, 1987, Congressman Manuel Lujan, Jr., commissioned a South Valley Task Force, constituted of local experts, to examine the environmental and economic concerns in the Valley, and to recommend measures to improve the situation. The Task Force's findings and recommendations are described in detail in the "South Valley Task Force Final Report" of August, 1987. The implementation of successful solutions to the South Valley ground water problems would be beneficial not only to residents of the South Valley and the City of Albuquerque, but also to the national ground water effort.

Hearing

On November 21, 1987, the Subcommittee held a field hearing in Albuquerque, New Mexico, on ground water contamination in the Albuquerque area. The Subcommittee received testimony from Dr. Charles Reith, Chairman of the South Valley Task Force; Mr. Robert Knutilla, U.S. Geological Survey; Mr. Robert Hanneschlager, U.S. Environmental Protection Agency; Mr. Harry Davidson, Kirtland Air Force Base; Hon. Henry "Kiki" Saavedra, Member, New Mexico State Legislature; Hon. Verna J. Williamson, Governor, Isleta, N.M.; Mr. Bruce Gallaher, New Mexico Health and Environment Department; Dr. Bruce Thompson, University of New Mexico; Mr. Lenton Malry, Bernalillo County Commission; Mr. Gene Martinez, Bernalillo County Economic Opportunity Board; Councilor Steve D. Gallegos, Albuquerque City Council; Mr. Douglas Earp, Albuquerque Environmental Health Department; Mr. William H. Otto, Albuquerque Public Works Department Planning Group; Ms. Angela Berger, Mountain View Neighborhood Association; Mr. William Paul Robinson, Southwest Research and Information Center; Mr. Richard Moore, Southwest Organizing Project; Mr.

Fred O'Chesky, Public Service Company of New Mexico; Mr. Jesse Karler, Karler Packing Company, Inc.; and Mr. Terry W. Rogers, Delphi Research. Committee Publication Number 100-104.

3.3(h)—The Future of Long Island's Groundwater Resources

Background

A single ground water aquifer is the sole source of water for the more than three million people that live in the Long Island counties of Nassau and Suffolk. Because of Long Island's porous soils, contaminants readily move through the ground and into the aquifer. Once in the aquifer, the contaminants spread slowly and may persist for decades, if not centuries.

Long Island's ground water has experienced significant contamination from nitrates and synthetic organic chemicals (SOCs). Nitrates, introduced into the ground water from septic systems, cesspools, and lawn and agriculture fertilizer applications, have long been of concern as Long Island's population grew rapidly after World War II. Nitrate contamination has been detected throughout the more populated Nassau County area, and has forced the closure of 21 public drinking water wells.

Most of the SOC's detected in Long Island's ground water come from leaking underground petroleum tanks, solvents, and pesticides. SOC's have contaminated significant portions of Long Island's ground water, leading to the closing of 2,700 out of 70,000 private wells. New U.S. Environmental Protection Agency regulations are expected to close an additional 54 out of the remaining 429 public drinking water wells in Nassau County.

In addition to contamination problems, Nassau County has a water quantity problem. Areas of high population density pump more ground water than can be replenished through natural processes. This "mining" of ground water changes the natural ground water flow, accelerating the spread of contaminants, reducing wetlands and surface stream flow, and causing intrusion of salt water and resulting chloride contamination of the aquifer.

Hearing

On November 30, 1987, the Subcommittee, in conjunction with the Senate Environment and Public Works Subcommittee on Water Resources, Transportation, and Infrastructure, held a hearing in Mineola, Long Island, to explore issues relating to the contamination and depletion of Long Island's ground water supplies. The Subcommittee heard testimony from New York State Attorney General Robert Abrams, who called for a mandatory state waste recycling program to reduce the reliance on landfills which are a major source of ground water contamination. The Attorney General also agreed that the existing fragmentation of responsibility for ground water protection among various federal, State, regional, and local governmental entities was inhibiting the development of a comprehensive, coordinated, and enforceable plan to protect ground water.

The Subcommittee also heard from a panel of witnesses including concerned citizens of Long Island, and business and environmental group representatives. Testifying were Ms. Sarah Meyland,

Long Island Citizens Campaign; Mrs. Viki De Jong, Citizens Committee for Civil Action; Mr. James Larocca, Long Island Association; and Mr. James Tripp, Environmental Defense Fund. Ms. Meyland noted that Nassau County has no comprehensive ground water plan, no plan to protect open spaces, and no single water authority to regulate water withdrawals, water conservation and water quality. She also presented the highlights of the recommendations contained in a recent report prepared by the Citizens Campaign and other groups, "Hard Choices: An Action Plan for the Protection, Correction and Conservation of Nassau County's Water Supply." Ms. Meyland was also critical of the failure of Congress to fund and implement the sole source aquifer provisions of the Safe Drinking Water Act. Mrs. De Jong was equally critical of the failure of Nassau County to take appropriate actions to increase water conservation and restrict development that threatens ground water quality. Mr. Larocca stated that the "leading economic issue" identified by the Long Island business community was water quality. Mr. Larocca also emphasized the importance of local and State leadership for water conservation and ground water protection. Mr. Larocca also discussed the possibility of tying federal funds to implementation of a coordinated groundwater program for Long Island. Mr. Tripp commented on the need for federal standards and urged adoption of recommendations contained in the "Hard Choices" report.

The panel also heard from State and local government officials: Mr. George Proios, New York State Legislative Commission on Water Resource Needs for Long Island; and Mayor Ann Galante of Mineola. Mayor Galante reviewed the problems of protecting ground water from a township's point of view, and noted some of the programs that the town has instituted to minimize potential contamination. Mr. Proios reviewed the recommendations made in several reports on Long Island's ground water situation by the State Commission, noting that little work had been done to estimate the potential costs of alternative water supplies or extensive water treatment for Nassau County. Committee Publication Number 100-71.

3.3(i)—Modernization of the Weather Service

Background

The National Oceanic and Atmospheric Administration has been planning to begin a number of major procurements to modernize the National Weather Service. The new technologies to be employed include: a new generation of weather satellites; the first new weather radars since the 1950's (NEXRAD); new automated weather observation systems (ASOS); and new communication, data processing and display systems (AWIPS) to transmit weather information to forecasters and other users.

The current weather radars operated by the National Weather Service are over 25 years old and generally obsolete. A next generation radar (NEXRAD) is essential for the National Weather Service, as well as the Federal Aviation Administration and the Air Force, to satisfy their requirements for information concerning

the genesis, location, intensity, and movement of severe weather systems.

NEXRAD, as a system, is an automated Doppler weather radar designed to acquire, process, and distribute improved weather radar information. NEXRAD, in contrast to conventional radar, detects and measures the velocity of water droplets and dust particles in the atmosphere. The signals, which are converted to digital form, are processed to create graphic displays, alphanumeric, and data array products, substantially increasing the lead time for severe storm warnings.

The current methods used to obtain weather observations are labor-intensive. The National Weather Service Currently involves approximately 1,200 employees nationwide in conducting these surface observation activities. The current workload is such that these employees cannot always meet the demands for other basic weather services and still provide weather observations.

The National Weather Service plans to implement an automated weather observation system capable of being deployed in various site-specific configurations. This Automated Surface Observing System (ASOS) will employ modern technology to acquire, process, store, format, and distribute weather observation data. It is designed to interface with existing and future weather data distribution systems (such as AWIPS) and operate with or without contributions of weather observers.

The National Weather Service's communication system, known as the Automation of Field Operations and Services (AFOS) system, is obsolete since it lacks the capability to process and analyze large volumes of fine-scale data from satellites and from NEXRAD, along with other weather observation information. Consequently, the National Weather Service has plans to implement an advanced system, the Advanced Weather Interactive Processing System (AWIPS), a highly automated integrated weather information processing and display system which will expand the forecaster's ability to provide local weather warnings and forecasts.

The AWIPS system will include on-station computer processors an associated software to receive, store, manipulate, and process various kinds of data; produce local displays and respond to inputs from the forecaster; support the forecaster in the generation of weather predictions; and deliver these weather products and selected data to a large number of distribution and dissemination ports.

The AWIPS system would be able to collect data from surface observational networks, NEXRAD and conventional radar data, radiosonde or profiler data from upper-air sounding sites, satellite imagery and sounding data, as well as selected graphic and alphanumeric products, data from other AWIPS installations, and guidance information from National Centers and field offices. This data base would be received, stored, and structured so that local forecasters could access and combine data and images to conduct complex analyses for substantially enhanced weather forecasts.

The Administration's fiscal year 1989 budget request provided no funding for AWIPS, cutting \$14,348,000 from the planned program, and indicating that NOAA would reexamine the overall costs of the modernized weather service and related impacts on system requirements.

Hearings

The Subcommittee on Natural Resources, Agriculture Research and Environment held a hearing on the Administration's plans to modernize the weather service on March 8, 1988. The purpose of the hearing was to assure that the procurement of advanced weather technologies is timely, efficient, and effective, while also assuring that any restructuring of the weather service due to increased automation results in an improved and effective weather forecast system. Of particular concern to the Subcommittee was the proposal to terminate AWIPS, the nerve center of a modernized weather service.

All the witnesses at the hearing, including the Administration witness, recognized the urgent need to upgrade the equipment used by the National Weather Service. Testimony was overwhelmingly in support of AWIPS development and procurement, as well as state-of-the-art supercomputers for the National Weather Service Meteorological Center.

Witnesses at the hearing included Dr. Joe Friday, Deputy Assistant Administrator of the National Weather Service; Dr. Werner Baum, Dean, College of Arts and Sciences, Florida State University; Dr. Richard Anthes, Director, National Center for Atmospheric Research; Dr. George Cressman, former Director, National Weather Service; Dr. Warren Washington, Director, Climate and Global Dynamics Division, National Center for Atmospheric Research; Dr. Len Snellman, Adjunct Professor of Meteorology; University of Utah; Dr. Hazen Bedke, Adjunct Professor, University of Utah; Mr. David Gompert, Vice President, Major Civil Government Programs, A.T. & T; Mr. Harold Wilson, Vice President, System Integration Division, Planning Research Corporation; Mr. J. Patrick Horner, President, Government Marketing Division, Electronic Data Systems Corporation; Mr. William Parlee, Manager, Shipboard and Ground Systems Group, UNISYS Corp.; Mr. Gilbert Rye, Vice President, Government marketing, COMSAT Corp.; Mr. Albert J. Kaehn, Director, Harris Corporation; and Mr. Don Latham, Vice President, Systems Group, Computer Sciences Corporation. Committee Publication Number 100-82.

3.3(j)—The Status and Future of the Landsat System

Background

Since 1972, the U.S. Government has launched five Earth remote-sensing satellites known as "Landsat". The final satellite in the series—Landsat 5—was launched in 1984 and is approaching the end of its designed lifetime. Even if the U.S. were to restart an aggressive Landsat program, there will possibly be a gap in coverage between the demise of Landsat 5 and the launch of Landsat 6 in 1991.

Land remote-sensing satellites provide useful information on oil and mineral deposits, hydrological patterns, vegetation including agricultural crops, and other renewable and nonrenewable resources. In recent years, Landsat data have also been increasingly useful in the defense and intelligence communities. In fact, civilian

land remote-sensing photographs appear several times in the recently released DOD study "Soviet Military Power."

The Science, Space, and Technology Committee played a major role in drafting and passing the Land Remote-Sensing Commercialization Act of 1984 (P.L. 98-365), which provided for a subsidized (\$250 million), ten-year transition of Landsat operations from the government to the private sector. In 1985, the Department of Commerce signed a contract for Landsat operations with EOSAT Corporation, a cooperative venture between Hughes and RCA. In return for a \$250 million subsidy, EOSAT agreed to build, launch, and operate Landsats 6 and 7—thereby guaranteeing the U.S. at least 6 additional years of land remote-sensing capability.

Ever since the ink dried on the EOSAT contract, funding for the follow-on system has been a major problem. The Administration requested no funding for the EOSAT contract in FY 1986 or FY 1987. However, in the FY 87 Supplemental request, the Administration did request funding in the FY 1988 budget for a one-satellite (Landsat 6 only) system, but the plan was rejected as inadequate by the Senate Appropriations Committee in January 1987. Subsequently, the Administration provided a plan that provided funding for Landsat 6 and a commitment to develop Landsat 7, the precise configuration of which would follow studies of options for advanced remote sensing, taking into account data markets, advanced instruments and spacecraft and launch options. This plan was approved by the Appropriations Committees of the House and Senate on October 15, 1987. This plan required a modification of the contractual relationship between the government and the contractor. In the FY 88 Continuing Resolution, the release of appropriated funds was conditioned upon a renegotiated contract between NOAA and EOSAT being approved by the Appropriations Committees of the Congress. The modified contract was forwarded to Congress on March 16, 1988.

Hearings

In the Spring of 1987 after the U.S. expenditure of approximately \$1.5 billion, the Landsat program was foundering, and the French and Japanese governments were poised to inherit both the technology and the potential market place in remote sensing. As noted above, the Committee held two days of hearings in early April of 1987 to review the costs and benefits associated with maintaining a national capability in earth remote sensing. These hearings demonstrated that a continued Landsat program—involving a strong commitment to Landsat 6 and 7 is important to the Nation in a number of ways, not the least of which are national security and technological competitiveness.

The Committee worked with the Administration to develop an acceptable plan to fund the Landsat system, which was approved by the Appropriations Committee in October 1987. However, funding was conditioned upon the government and private sector contractor, EOSAT, reaching a successful contract modification by April 1, 1988. The contract was subject to approval by the House and Senate Appropriations Committees.

On March 16, 1988, the renegotiated modification to the Commerce Department's Landsat commercialization contract with

EOSAT was forwarded to the House and Senate. The Subcommittee on Natural Resources, Agriculture Research and Environment convened a hearing on March 23, 1988 to determine whether the contract modification represented a viable option for continuing our remote sensing program; and whether an acceptable level of planning was underway for the development of an advanced commercial land remote sensing systems for the mid-1990s and beyond.

Testimony was heard from Mr. Thomas N. Pyke, Assistant Administrator for Satellite Information Services, National Oceanic and Atmospheric Administration, U.S. Department of Commerce and Mr. Peter M. P. Norris, Executive Vice President of the Earth Observation Satellite Company (EOSAT).

The modified Landsat 6 contract provides a total satellite/launch cost package of \$256.5 million. Of this amount, \$220 million will be for the spacecraft.

Landsat commercialization under the contract modification:

[In millions of dollars]							
	1986 and prior	1987	1988	1989	1990	1991	Total
Spacecraft.....	90.0	62.5	10.0	20.6	36.9		220.0
Launch 36.5.....				13.5	15.0	8.0	
Total.....	90.0	62.5	10.0	34.1	51.9	8.0	256.5

The government contribution for the spacecraft will be \$209.2 million. The remainder of the spacecraft costs (\$10.8 million) is to be provided by a revenue sharing arrangement by which EOSAT will pay the first \$2.5 it earns in revenue each year until the \$10.8 million is paid back to the government.

Funding profile for EOSAT is proposed as follows:

[In millions of dollars]						
	Fiscal year—					Total
	1986	1987	1988	1989	1990	
Maximum Government exposure.....	90.0	62.5	10.0	24.1	33.4	220.0

	Fiscal year—					Total
	1986	1992	1993	1994	1995	
Expected EOSAT pay back schedule.....	2.5	2.5	2.5	2.5	0.8	10.8
Net cost to Government.....	209.2					

This revenue stream cannot be guaranteed because of potential demise of Landsat 4 and 5 (both operating beyond their projected lifetimes). Therefore, to limit the government exposure in the contract, NOAA has negotiated a lower launch cost. The OMB-approved Landsat commercialization plan was promised at a launch

cost of \$48.3 million. The renegotiated launch costs are expected to be \$37.5 million.

The proposed funding profile for the June 1991 Titan II launch, negotiated with the USAF, is as follows:

	Fiscal year—			Total
	1989	1990	1991	
Launch.....	13.5	15.0	8.0	36.5

The modified Landsat contract was approved by the House and Senate Appropriations Committees shortly after the Subcommittee hearing.

During the hearing, the Subcommittee also reviewed the status of the ongoing Advanced Remote Sensing study. The FY 88 Continuing Resolution, provided \$2 million to study the configuration of Landsat 7. The House Appropriations Committee report described the study as follows: "The Committee expects the Department of Commerce to conduct a study of options for subsequent remote-sensing activities, taking into account data markets and applications, advanced instruments and spacecraft and launch options. As part of the study, the Committee expects the Department to examine opportunities for government and industry partnership with substantial industry investment, participation by other government agencies, and an international cooperative partnership. The Committee expects that this study will provide the basis on which the Congress can determine policy on the future of any advanced commercialized system."

The Department of Commerce issued an RFP on December 4, 1987, seeking proposals for a study of all or any of the following issues: (1) Market Survey, (2) Financing, (3) Sensor and Data Processing Technology, and (4) Spacecraft Technology and Launch Options.

On January 15, 1988, the Department of Commerce received proposals for three comprehensive and five limited studies. The Department selected three contractors to conduct the studies which are expected to be completed and submitted to Congress by the end of the year. Committee Publication Number 100-92.

3.3(k)—Environmental Health in the Twenty-First Century

Background

From 1970 to 1985, the United States has spent more than \$500 billion on pollution control. As some conventional air and water pollutants have been brought under increasing control, attention has begun shifting to a "new" category of pollution. Rather than focusing on large point-source discharges into air or water typical of conventional pollution, the "new" pollution focuses on the low level of toxic chemicals that are found throughout the environment—in food, drinking water, soil, and indoor and outdoor air. Controlling these new environmental risks is not only likely to be more technologically difficult and expensive, but also likely to be less amendable to legislative solutions.

The future of environmental health is likely to be dominated by these newer pollution problems as the conventional sources of pollution come under increasing control. Improvements in analytical chemistry are likely to demonstrate that the environment is pervasively contaminated with very low levels of toxic chemicals, which frequently move with ease from one media (such as air) to another (such as ground water). Public health scientists will therefore need to focus more on total exposure assessment, a methodology which takes into account the total exposure of a person to contaminants from all sources. At the same time, expected improvements in medical technology are likely to sharply improve the ability of scientists to detect subtle health effects from toxic chemical contamination, such as neurotoxic effects which may have temporary or subtle effects on learning behavior, memory, cognition, or attitudes. These trends will challenge the traditional environmental health policy designed to ensure that pollution causes no adverse health effects. As it becomes increasingly clear that the concept of "zero risk" has little meaning, serious questions of public health policy and environmental research directions will be raised.

Hearing

On April 6, 1988, the Subcommittee held a field hearing in Research Triangle Park, North Carolina, in conjunction with a symposium on environmental health in the twenty-first century convened by the National Institute for Environmental Health Sciences. The Subcommittee heard testimony from government and academic scientists who addressed emerging environmental health trends, including Dr. David Rall, Director, National Institute of Environmental Health Sciences; Dr. Robert Goyer, University of Western Ontario; Dr. Ellen Silbergeld, Environmental Defense Fund; Mr. Ken Sexton, Director of Health Research, U.S. Environmental Protection Agency; Dr. Sanford Miller, University of Texas San Antonio; Mr. Gershon Fishbine, Environmental Health Letter; and Dr. Bernard Goldstein, UMDNJ-Robert Wood Johnson Medical School. Committee Publication Number 100-123.

3.3(1)—Review of the FY 1989 Environmental Protection Agency Research Program Budget Request

Background

The Subcommittee convened a hearing on April 21, 1988, to review the Administration's fiscal year 1989 budget request for research programs. EPA's research program supports the Agency's regulatory mission under various environmental statutes, including the Clean Air Act, the Clean Water Act, the Toxic Substances Control Act, the Solid Waste Disposal Act, the Federal Insecticide, Fungicide and Rodenticide Act, the Safe Drinking Water Act, and the Comprehensive Environmental Response, Compensation and Liability Act.

The Administration had requested a total of \$375 million for FY '89 research and development activities, an increase of \$22.7 million, or 6.4 percent, over fiscal year 1988 appropriations levels. While the FY 1989 request provides a modest increase, adjusted for inflation, the fiscal year 1989 request remains about twenty per-

cent below fiscal year 1981 funding levels. Total full-time personnel have declined by nearly 500 positions, or about twenty percent, since fiscal year 1980.

Hearing

The Subcommittee received testimony from Dr. Vaun Newill, the Assistant Administrator of EPA's Office of Research and Development (ORD). Dr. Newill testified that, despite increases in certain research programs, EPA's grant program to support investigator-initiated research in areas of importance to environmental protection had declined and that EPA would not be able to support any new grants under the budget proposal. Dr. Newill agreed with the conclusions of a contractor report which stated that EPA's grants program was a significant and unique resource of funding for many areas of environmental research for university scientists.

The Subcommittee also received testimony from Dr. Morton Lippman, Institute of Environmental Medicine of New York University, and Member of the EPA's Science Advisory Board Subcommittee on the Research and Development Budget. Dr. Lippman presented the major recommendations of the Science Advisory Board's report on the fiscal year 1989 research budget request. The SAB report concluded that the demands placed upon the Agency for new knowledge through research continued to grow at a faster pace than the increase in research funding.

Dr. William E. Bishop, President of the Society of Environmental Toxicology and Chemistry, and Dr. Richard G. Luthy, President of the Association of Engineering Professors, also testified on the need of additional funding of research with respect to environmental risk assessment and engineering. Committee Publication Number 100-116.

3.3(m)—Oversight of the National Acid Precipitation Program

Background

The Subcommittee authorizes the acid deposition research program of three agencies that participate in the federal interagency National Acid Precipitation Assessment Program (NAPAP): the Environmental Protection Agency (EPA), the Department of Energy (DOE), and the National Oceanic and Atmospheric Administration (NOAA). Taken together, the three agencies account for nearly 80 percent of the \$85 million funding for the NAPAP program. NAPAP was created by the Acid Precipitation Act of 1980 (Title VII of the Energy Security Act of 1980, P.L. 96-294).

In April, 1987, the Government Accounting Office released a report, "Acid Rain: Delays and Management Changes in the Federal Program," which discussed inter alia the failure of NAPAP to issue required annual reports and a key midterm assessment document in a timely fashion.

Two years later, the "interim assessment" was published in September, 1987. The Interim Assessment, and in particular, the Executive Summary, sparked immediate controversy. Several scientists, environmental groups, and the Canadian government denounced the Executive Summary as a distortion of the scientific research contained in the more voluminous technical appendices. Many re-

viewers stated that while the underlying science was quite good, the way in which the facts were presented tended to minimize the extent of the acid rain problem.

Hearing

The Subcommittee held a hearing on April 27, 1988, to review the management and progress of NAPAP, to review NAPAP's Interim Assessment, to examine the extent of the scientific and policy uncertainties that are likely to remain at the conclusion of the NAPAP research program in 1990, to review the plans for producing the Final Assessment due in 1990, and to consider the need for, and organization of, acid rain research after 1990.

The Subcommittee received testimony from Dr. James R. Mahoney, Director of the National Acid Precipitation Assessment Program, and the Members of the NAPAP Interagency Science Committee: Dr. George Y. Jordy, Department of Energy; Dr. William Sommers, Department of Agriculture; Dr. R. Jack Pickering, Department of Interior; Dr. Courtney Riordan, Environmental Protection Agency; Dr. Lester Machta, National Oceanic and Atmospheric Administration; and Dr. James S. Morris, Tennessee Valley Authority.

At the hearing, Dr. Mahoney underscored his commitment to producing a scientifically credible assessment document in 1990 which would be useful to policymakers. In response to criticisms of the Interim Assessment, Dr. Mahoney agreed to supply to the Subcommittee by September, 1988, a response to the criticisms, an analysis of whether scientific information which had become available since the Interim Report would affect its conclusions, and a plan for addressing the criticisms in the Final Assessment. The response was received by the Subcommittee on September 16, 1988, and included as part of the hearing record.

The Subcommittee also received testimony from Dr. Gene Likens, Institute of Ecosystem Studies, New York Botanical Garden, who addressed the findings of the Interim Assessment; Dr. James Galloway, University of Virginia, who discussed research on acidification of Eastern streams not included in the Interim Assessment; and Mr. Joseph Goffman, Environmental Defense Fund (EDF), who addressed the energy projections portion of the Interim Assessment and a recent report by EDF on the contribution of acid rain to water pollution in the Chesapeake Bay. Committee Number Publication 100-125.

3.3(n)—Field-Testing of Genetically-Engineered Organisms

Background

The past five years have seen the movement of genetically-engineered organisms move from the laboratory-contained development phase to the field testing and commercialization phase. Despite the publication of the Coordinated Federal Framework for the Regulation of Biotechnology, in July 1986, concerns have been raised regarding the adequacy of the federal review process for biotechnology products. Since that time, the Biotechnology Science Coordinating Committee (BSCC) has failed to produce a definition of such essential terms such as "release to the environment." The Environ-

mental Protection Agency has failed to promulgate rules under the Toxic Substances Control Act for genetically-engineered organisms. Absent these critical elements in the federal regulatory structure, concerns continue to be raised about the risks associated with the use of altered organisms in the environment.

Hearing

On May 5, 1988, the Subcommittee on Natural Resources, Agriculture Research, and Environment convened to consider a report prepared by the Office of Technology Assessment entitled, "Field Testing Genetically Engineered Organisms: Genetic and Ecological Issues," and to review the experience of federal agencies in reviewing and regulating field tests of genetically engineered organisms.

The Subcommittee heard testimony from Dr. Luther Val Giddings, Office of Technology Assessment; Dr. James Wyngaarden, National Institutes of Health; Dr. John A. Moore, Assistant Administrator, Office of Pesticides and Toxic Substances, Environmental Protection Agency; and Dr. Kenneth Giles, Assistant Secretary for Marketing and Inspection Services, U.S. Department of Agriculture. Committee Publication Number 100-108.

3.3(o)—The Quality of Health Care: Information for Consumers

Background

The growing government investment in health care, has led to increased concern about the quality of the health care services that are provided. The proportion of the Nation's health care bill borne by the federal government has led to a strong commitment on the part of agencies such as the Health Care Financing Administration to monitor the quality of services provided. The \$70 billion (in 1987) Medicare program alone, has made the intervention of federal agencies a powerful tool for improving health care delivery. In addition, the consumer movement has given rise to demands for informed choices based upon reliable assessments of medical providers.

Hearing

The Subcommittee on Natural Resources, Agriculture Research, and Environment held a hearing on June 6, 1988 in New York City to consider how information on the quality of health care services could be made available to consumers to aid them in making decisions related to the purchase of medical services.

The hearing focused on the recommendations contained in the recently completed Office of Technology Assessment report entitled, "The Quality of Medical Care: Information for Consumers." Dr. Jane Sisk of OTA outlined the findings of the report which called for increased research into defining methods and techniques for assessing the quality of medical care. The Subcommittee also heard testimony from Ms. Sondra Bauernfeind, Victims Against Medical Abuse; Ms. Marian Stackhouse, Sullivan County Coroner; Mrs. Elaine O'Rourke, Stop Hospital and Medical Errors (SHAME); Louis Krieger, American Association of Retired Persons; Ms. Esther Lustig, Lexington Center for the Deaf and Hearing Impaired; Dr. Lowell S. Levin, Yale University School of Medicine;

Dr. David Axelrod, Commissioner, New York State Department of Health; William Tobey, Regional Administrator, Health Care Financing Administration; Dr. Charles D. Sherman, Medical Society of the State of New York; Dr. Juanita K. Hunter, New York State Nurses Association; Ms. Suzanne G. Martin, New York City Health and Hospital Corporation; Ms. Carolyn Scanlan, Hospital Association of New York State; Ms. Carol Dye, Hospital Trustees of New York State; and Ms. Rose Ann Liveo, SHAME. Committee publication Number 100-105.

3.3(p)—Technologies for Conserving Species; Saving the Endangered Rhinoceros

Background

Every two to three years, the world loses another fifty percent of its rhinoceros population. The rhino's contemporary and dramatic demise makes it the best-documented loss of species to date. The fight to save the rhino thus makes an excellent case study in state-of-the-art endangered species conservation. Of the five species of rhinoceros, the African black rhino stands out because of the swiftness and magnitude of its decimation, and because conservationists recognized the animals plight early enough to enable them to take action.

The rhino's decline is due not only to the loss of native habitat, but also due to extensive poaching. Used in traditional folk medicines in the Orient, and carved into ceremonial dagger handles in North Yemen, the rhino's horn is worth its weight in gold.

Many different public and private groups are currently involved in rhino conservation. The Government of Kenya has a well-developed rhino rescue plan; Zimbabwe follows a less articulated strategy but is actively working to preserve its remaining wild rhino populations from marauding bands of poachers.

The leading non-government organization involved in rhino conservation is arguably the African and Elephant Rhino Specialist Group (AERSG), based in East Africa. An arm of the International Union for the Conservation of Nature, AERSG provides a forum for discussion, information exchange, and policy development offering some limited financial resources.

In the U.S., the American Association of Zoological Parks and Aquariums is a coordinating body for much of the research being conducted by American zoos and conservation biologists. Organizations like Rhino Rescue USA, Wildlife Conservation International, the World Wildlife Fund, and Save the African Endangered Wildlife (SAVE), provide a mix of funding, assistance, public relations, and scientific expertise.

The U.S. Agency for International Development (AID) provided \$100,000 in matching grants for rhino conservation worldwide in 1987 as part of its budget for biodiversity programs.

The Subcommittee on Natural Resources, Agriculture Research, and Environment first examined the plight of the rhino in the 99th Congress. In that hearing, Singapore was identified as a major entrepot in illegal international rhino trade. As a result of the hearing and subsequent pressure exerted by the Fish and Wildlife Service and the State Department, Singapore agreed to ban all trade in

rhino products and to join CITES, the Convention on Trade in Endangered Species.

Hearing

The Subcommittee on Natural Resources, Agriculture Research, and Environment held a hearing on June 22, 1988, to review the progress in ending the international trade in rhino horn, to review efforts to thwart poaching through the establishment of sanctuaries and armed antipoaching squads, and to examine efforts to manage remaining populations in the wild and to breed them in captivity.

The Subcommittee heard testimony from Dr. Thomas J. Schneider, Chairman, and Mr. Robert M. Schule, Trustee, Rhino Rescue USA; Dr. David Western, Chairman, IUCN African Elephant and Rhino Specialist Group and Acting Director, Wildlife Conservation International; Dr. Esmond Bradley Martin; Dr. Willie Nduku, Director, Department of National Parks and Wildlife Management, Zimbabwe; Dr. Oliver A. Ryder, San Diego Zoo; Dr. Thomas J. Foose, American Association of Zoological Parks and Aquariums; Dr. Eric Dinerstein, Smithsonian Institution; Mr. Tony Dyer; and Mr. Brian Carey, Armstrong Tire Co. Committee Publication Number 100-133.

3.3(q)—Technologies for Remediating Global Warming

The Subcommittee on Natural Resources, Agriculture Research, and Environment and the Subcommittee on Science, Research, and Technology held a joint hearing on June 29, 1988, to examine potential technologies to reduce the fossil fuel emissions which have been implicated in global warming. For a full discussion of the background and hearing, see the discussion under the Subcommittee on Science, Research and Technology, below. Committee Publication Number 100-137.

3.3(r)—H.R. 5000, the Recyclable Materials Science and Technology Development Act of 1988: Plastics in the Environment

Background

Public attention and Congressional action on plastic pollution has focused within the last few years on the threat of plastics to marine environments. An OTA study in July 1987 estimated that hundreds of thousands of sea birds and 100,000 marine mammals die each year by ingesting or becoming entangled in plastic debris. Six pack rings are particularly implicated in sea bird entanglement, and plastic bags are a threat to marine turtles which mistake them for jellyfish.

In recent weeks, debris washing up on Northeastern U.S. beaches has renewed concern about the disposal of materials in the oceans, including plastic materials. According to the Environmental Action Foundation, a recent 3-hour beach clean-up along 157 miles of Texas coast netted 31,773 plastic bags, 30,295 plastic bottles, 15,631 plastic six-pack rings, 28,540 plastic lids, 1,914 disposable diapers, 1,040 tampon applicators, and 7,460 milk jugs.

The amount of plastic debris in the oceans is not well established. Estimates range from 100 million to 500 million pounds annually, most of which stems from the commercial fishing industry's garbage disposal and fishing net losses. Land based plastic manufacturing activities, sewage operations, solid waste disposal (including seepage from landfills) and littering are also major sources of pollution in the oceans.

Littering has been the focus of municipal attention for many years, and many areas threaten litterers with high fines. Plastics are often the focus of public concern over littering because they are highly visible and nondegradable.

Most recently, plastics have become a focus of attention as a part of the larger national waste problem. Several thousand landfills have already closed, and the Environmental Protection Agency estimates that over the next four years, 27 states will face critical landfill capacity problems. Approximately 80 percent of all wastes—nearly 200 million tons of trash each year—is landfilled, while 10 percent is recycled and another 10 percent is incinerated. Many municipalities are already feeling the increasingly high costs associated with waste disposal as landfills around them close.

Plastics are only about 7 percent of landfilled waste by weight, but analysts say the amount will rise to 10 percent by 2000. Furthermore, plastics tend to be bulky, and thus make up closer to 15 percent of landfilled waste by volume. About 50 percent of plastic in landfills is packaging material. Most plastics are extremely durable materials and may last in a landfill for centuries. Incineration is one option to reduce the use of land disposal. However, incineration is of concern because residual ash, which may contain heavy metals and other toxic elements, must still be landfilled. Additionally, incineration of plastics, particularly polyvinyl chloride (PVCs), can create airborne dioxins and furans that can pose a threat to public health.

State and local governments have been quite active on the issue of plastic waste control. More than a dozen states are considering legislation to restrict the use of plastics such as egg cartons, disposable diapers and grocery bags. A number of municipalities have enacted legislation. In April, Suffolk County, New York, adopted legislation that will ban use at the retail level of plastic grocery bags and many plastic food containers beginning in July 1989. The city of Berkeley, California has enacted legislation which would ban nondegradable fast food packaging. The state of Florida has also adopted new legislation to address its solid waste crisis.

Over the last several years, a number of companies have developed degradable plastics. In general, there are two categories of degradable plastics: photodegradable plastics, which decompose under light, and biodegradable plastics, which require microbial action to decompose them. The latter product has drawn the attention of agricultural interests, since the key degradable ingredient comes from corn. As research continues, more specialized and complex forms of degradable plastic are emerging.

The technology has developed to a point where virtually any form of plastic can be made degradable. Plastic sheet mulches, cups, straws, six-pack rings, fast-food containers, milk jugs, soda bottles, and grocery bags can now all be made in degradable forms.

Degradable plastics are beginning to be widely used in Canada and Italy, among other countries. In the U.S., however, its use in packaging has been delayed by the lack of Food and Drug Administration approval.

Hearings

On August 10, 1988, the Subcommittee on Natural Resources, Agriculture Research, and Environment held a hearing on H.R. 5000, the Recyclable Materials Science and Technology Development Act of 1988, and on the potential of degradable plastics to address waste problems. H.R. 5000 would require, over a five year period, the development of recyclable consumer goods. After five years, those goods which could not be feasibly recycled would be required to be degradable.

There are a number of issues that need to be resolved in determining the role that degradable plastics can play. Most analysts agree, however, that degradable plastics will ultimately be only one part of a multifaceted strategy that will be needed to address the nation's impending solid waste crisis. Issues examined at the hearing included: (1) To what extent are degradable plastics likely to play a role in solving plastic pollution problems? Are they equally suited to address marine pollution, litter, and municipal landfill problems? (2) Is there an inherent conflict between recycling plastics and the greater use of degradable plastics? (3) Are the gaps in our knowledge about the effects of degradable plastics on health and the environment? If so, should the Federal government play a role in finding answers to those questions? (4) What are the respective federal and state roles in creating market incentives for the greater use of recycling or degradable materials?

The Subcommittee heard testimony from the Honorable Martin Lancaster (D-NC), the Honorable Jim Courter (R-NJ), the Honorable Benjamin A. Gilman (R-NY), Senator George Kirkpatrick, Florida State Senate; Ms. Jeanne Wirka, Environmental Action; Mr. Patrick H. Toner, Society of the Plastics Industry; Mr. Zoltan J. Dworko, Enviromer Enterprises; Mr. Roger Lloyd, ICI Americas, Inc.; and Mr. Wayne Maddever, St. Lawrence Starch Co., Inc. Committee Publication Number 100-132.

3.3(s)—Remediation Strategies for the Stringfellow Superfund Site

Background

The Stringfellow Superfund site in Glen Avon, California, has become a national case study for the legacy of careless dumping of hazardous wastes and the enormous costs and technical challenges of clean-up.

During the 1950s and 1960s, the Stringfellow quarry site was used as a dump for a wide range of hazardous and industrial wastes, including acids, pesticides, chlorinated solvents, PCBs, metals and volatile organic chemicals. In 1969, heavy rains caused an overflow from the waste pits which flowed into the lower-lying community. In 1972, the first signs of groundwater contamination were detected. Dumping ended in 1972, and various efforts began to clean and close the site. In 1978, the pits again overflowed into the community. Studies done in 1980 indicated that much of the prior

engineering work to secure Stringfellow was inadequate, and estimated the total cost of removal of contaminated material as \$20 to \$40 million.

After passage of Superfund in 1980, Stringfellow became California's number one Superfund site, and it was added to the National Priorities List in 1982. Despite further effort by EPA and others to contain the wastes, a report in 1983 indicated that the plume of contaminated groundwater had traveled twice as far as had been expected and was already in the aquifer used by the Glen Avon community for drinking water.

In 1984, a contract was selected to begin work on the Remedial Investigation/Feasibility Study (RI/FS) to identify clean-up alternatives. The RI/FS was expected to take about 18 months and cost about \$1.5 million.

In 1987, two years late and as much as \$8.5 million over budget, the draft RI/FS was completed. The RI/FS identified five remedial options (not including the required "no action" alternative), ranging in cost from \$226 to \$812 million. The alternatives include various combinations of onsite dewatering, extraction and treatment of onsite leachate, soil-gas extraction, in-situ flushing, downgradient plume management, and excavation and treatment of all onsite diggable soil.

Hearings

The Subcommittee on Natural Resources, Agriculture Research and Environment convened a field hearing on September 10, 1988, to review the RI/FS alternatives and to explore the remedial technologies available for cleaning up Stringfellow in particular and Superfund sites in general. The hearings were held during the public comment period on the RI/FS to enable the hearings to make a contribution to public understanding and review of the RI/FS. The hearing also reviewed the progress in cleaning-up the Stringfellow site since the Subcommittee's previous field hearing in 1983.

The Committee heard testimony from Mr. Alexander Cunningham, Chief Deputy Director, California Department of Health Services; Jan Meyer and Beth Jines, Toxic Substances Control Division, California Department of Health Services; Joe Petrelli, Science Applications International Corp.; Jeff Zelikson, Director, Toxic and Waste Management Division, U.S. Environmental Protection Agency; Joel Hirschorn, Senior Associate, Congressional Office of Technology Assessment; Ms. Penny Newman, Executive Director, Concerned Neighbors; and Dr. Joe Highland, Environ Corporation.

While the testimony supported at least some of the remedial technologies listed in the RI/FS, most of the comments expressed disappointment with the failure of the RI/FS to consider other promising technologies, particularly taking into account the cost and the delay in producing the RI/FS. Many of the comments also expressed strong reservations with alternatives that would leave contaminants in place at the Stringfellow site with plans to contain the site and to divert and treat groundwater contaminants. Several comments suggested that additional feasibility studies be carried

out on promising treatment technologies, including soil washing. Committee Publication Number 100--.

3.3(t)—Review of Indoor Air Quality Programs and H.R. 5373, the National Indoor Air Quality Act

Background

Because people spend 80 to 90 percent of their time indoors, the quality of indoor air has become an issue of rising concern to the public. However, the complexity of the variables involved make indoor air quality a complicated environmental issue. Because the circumstances leading to indoor air pollution vary greatly, it has been extremely difficult to design a single, comprehensive approach.

First, many different kinds of contaminants exist, such as inorganic gases (NO_2 , CO , SO_2), particles (asbestos), biological pollutants (viruses, bacteria, molds), radioactive gases (radon), and volatile organic compounds (household cleaners, solvents, pesticides). Second, contamination arises from a variety of sources, including gases from synthetic products, human activities, naturally occurring emissions, and even the ambient air outdoors. Third, exposure occurs in many different kind of buildings with different types of ownership, including single-unit residences, multi-unit residences, public buildings, offices, and schools.

Furthermore, the health risks associated with different contaminants are often difficult to assess because of a lack of reliable scientific information regarding human health effects, indoor air concentrations, amount of population exposed, or degree of exposure. This uncertainty is one of the reasons that indoor air policies are often adopted as a reaction to particular situations, such as asbestos in schools or radon contamination, instead of being based on a more general approach.

Human health effects of some indoor air contaminants have been well established. EPA estimates that radon causes between 5,000 and 20,000 cancer deaths a year. Other sources of indoor air pollution, not including exposure to asbestos or pesticides applied indoors, may be responsible for an additional 3,500 to 6,500 cases of cancer per year. Other health effects range from severe and debilitating allergic reactions to a general loss of comfort and worker productivity. In other cases, human health effects or degree of population exposure is still uncertain. However, the expansion of research in this field has generally supported the view that indoor air pollution is a much greater problem than originally perceived. In EPA's 1987 environmental comparative risk assessment, *Unfinished Business*, indoor air contamination ranked high as a human health hazard when compared to other forms of pollution.

Although the Clean Air Act establishes standards for the protection of ambient air quality, EPA has interpreted the term "ambient" to mean air outdoors. As a result, protection of air quality indoors is currently limited to a different set of federal, state, and local statutes.

Congress began to appropriate funds for EPA research on indoor air quality and radon mitigation in 1984, although overall guidance was lacking. In 1986, EPA's Science Advisory Board (SAB) recom-

mended that EPA pursue the development of a long-range research plan. Subsequently, Congress enacted the Superfund Amendments and Reauthorization Act (SARA) that included a provision requiring EPA to research indoor air quality health effects, to disseminate information concerning indoor air quality, and to assess appropriate federal actions to mitigate indoor air pollution.

H.R. 5373, the Indoor Air Quality Act of 1988, was introduced on September 23, 1988. The principal purposes of the Act are to: (1) strengthen EPA's indoor air research program; (2) issue health advisories indicating levels at which identified contaminants would have no adverse health effects; (3) focus the use of existing regulatory authority to implement a national response plan based on the health advisories; (4) provide grants to the States to assist them in developing basic management strategies and assessments; (5) establish an EPA office for indoor air activities and a coordinating inter-agency Council on Indoor Air Quality; and (6) give EPA the lead responsibility for developing a federal response to indoor air quality.

Hearings

On September 28, 1988, the Subcommittee held hearings to review H.R. 5373 and the general status of indoor air programs. The Subcommittee heard testimony from Senator George J. Mitchell; the Honorable Joseph Kennedy; Donald Clay, Acting Assistant Administrator, Office of Air and Radiation, U.S. Environmental Protection Agency; Ms. Sandra Eskin, Consumer Federation of America; Denis Parker, Service Employees International Union, AFL-CIO; Rosanne Bacon, President, Massachusetts Teachers Association, accompanied by Kathleen Clinton; Dr. Michael J. Hodgson, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); William H. McCabe, Jr., International Council of Shopping Centers; John Welch, Safe Building Alliance; and Denise Wilson, Building Owners and Managers Association International. Committee Publication Number 100--.

3.3(u)—The National Biological Diversity Conservation and Environmental Research Act (H.R. 4335)

To establish a national policy for the conservation of biological diversity; to support environmental research and training necessary for conservation and sustainable use of biotic natural resources; to establish mechanisms for carrying out the national policy and for coordinating related activities; and to facilitate the collection, synthesis, and dissemination of information necessary for these purposes.

Background and Summary of Legislation

Biological diversity refers to the variety and variability among living organisms and the ecological complexes in which they occur. The term encompasses genetic, species, and ecosystem diversity. Conservation of biological diversity refers to maintaining the full abundance and distribution of these components.

Biological diversity provides the raw materials for all of the food that we eat, most pharmaceuticals and medicines, clothing, and

shelter. Biological diversity provides the basis for scientific inquiry and ideas for technological development.

Conservation of ecosystems with their naturally diverse components is necessary to ensure continued ecological processes such as climate moderation (such as the reduction of global warming), production and conservation of soils, nutrient cycling and degradation of wastes and pollutants. Maintaining all the elements of biological diversity is necessary as an investment in the continued functioning of natural environments and as insurance against unforeseen future needs.

Conservation of biological diversity has become a policy issue because the Earth's biological diversity is being seriously reduced at a rapidly accelerating rate that is unprecedented in human history. Scientists have estimated that 20-25 percent of the living species may become extinct before the turn of the century if major actions are not taken. The seriousness of the loss of biological diversity is exacerbated because the loss is irreversible.

According to the Office of Technology Assessment Report, *Technologies to Maintain Biological Diversity*, (1987) "the most optimistic view of the consequences of reduced biological diversity is that resources that otherwise might improve the quality of life will not be available. At worst, reductions could mean a serious disruption of the ecological processes on which civilization depends".

Biological diversity in all forms is being reduced in all parts of the world. The causes are many, but generally are related to the desires of an evergrowing human population that often inadvertently destroys what otherwise could be sustainable and renewable biological natural resources. Most severe is the destruction of native habitats and fragmentation of landscapes into island-like pieces that can only support an impoverished fraction of their natural biota.

Tropical forests such as those found in Hawaii and Puerto Rico are the richest biotic communities in the world, containing more than 50 percent of the species in only about 8 percent of the land area. These forests are currently being destroyed at rates of 50-100 acres/minute. Only remnants will survive into the next century if this trend is not reversed. Although the destruction of the tropical forests is most severe and perhaps most critical, loss of biological diversity is occurring in all habitats in all parts of the world.

In the past, natural diversity was maintained without specific conservation efforts. But, as natural areas continue to be disrupted by human activities, specific measures must be developed and implemented to maintain biological diversity. "Onsite" measures to maintain natural areas are the best means of preserving a broad range of biological elements in the long term, but these measures must increasingly be coordinated with "offsite" measures aimed at protecting small but critical components of biological diversity such as the thousands of plant varieties critical to agriculture.

According to the OTA, maintaining biological diversity will require greater coordination of international conservation efforts. The United States must have a directed effort to conserve its own biological diversity in order to be a leader in international efforts.

Current legislation addressing the loss of biological diversity in the United States is largely piecemeal and uncoordinated. Al-

though many Federal laws affect conservation of diversity, few refer to it specifically. Existing Federal programs focus on preserving specific ecosystems, species, or gene pools, or on protecting endangered wildlife. Species protection laws authorize Federal agencies to manage specific animal populations and their habitats. Habitat protection laws authorize the acquisition or designation of habitats under Federal stewardship. Federal laws for offsite maintenance of plants authorize the collection and genetic development of selected plant species that demonstrate potential economic value.

All States have programs to protect their wildlife resources, many States are now addressing "nongame wildlife" issues, and most States have natural heritage programs to identify and protect rare biological elements. However, few if any, State programs address the loss of biological diversity in a coordinated way.

The current Federal approach, exemplified by the Endangered Species Act, is largely reactive, trying to preserve pieces of biological diversity, one-by-one after significant losses have already occurred. A proactive, coordinated approach that uses planning and science to maintain existing diversity is likely to be much more efficient and cost-effective in the long run.

Efforts to conserve biological diversity are hampered by an incomplete, inaccessible data base. There is no functioning national biological survey, national biological data base, and not even a national network of biological data bases. Trying to conserve biological diversity and use it wisely without knowing the location and distribution of biological elements has been likened to attempting to run a factory without a complete inventory.

H.R. 4335 addresses several of the options for Congressional action set out in the OTA report. The Act makes conservation of biological diversity a national goal and makes efforts toward conservation a national priority. To accomplish this, the Act requires biological diversity to be explicitly considered in environmental impact statements, and establishes a mechanism for a coordinated strategy for conserving biological diversity. The Federal strategy will be developed by a committee of the major Federal agencies that manage or study natural resources. The bill creates a scientific advisory committee to provide technical expertise to develop the strategy and to evaluate its implementation. Agencies participating in the strategy may enter into partnership grants with private individuals, organizations, and States to implement the strategy.

A National Center for Biological Diversity and Environmental Research is created to assess the status of our Nation's biological information base, to take steps to increase our understanding of our biological natural resources through a nationally coordinated research effort, and to make this information usable for policymakers. The Center is authorized to develop a coordinated network for biological data bases and to plan, initiate, and provide financial support for an ongoing survey of the biota of the Nation.

The bill authorizes \$25 million for three fiscal years with a limit on the funds for the agency grant programs.

Legislative History

H.R. 4335, the National Biological Diversity Conservation and Environmental Research Act was introduced on March 31, 1988 by Congressman James Scheuer (D-NY). H.R. 4335 was referred to the Committee on Science, Space, and Technology and the Committee on Merchant Marine and Fisheries.

The Subcommittee held hearings on H.R. 4335 on June 9 and June 30, 1988. The first hearing examined the policy objectives and structures proposed in the bill, and included representatives of Federal land management agencies and conservation groups. Testimony was received from the Honorable Daniel Akaka, who reviewed the biological diversity crisis in Hawaii; F. Dale Robertson, Chief of the U.S. Forest Service; Dr. Eugene Hester, Associate Director, National Park Service; Roland G. Robison, Deputy Director, Bureau of Land Management; Dr. M. Rupert Cutler, Defenders of Wildlife; Dr. Faith Campbell, Natural Resources Defense Council; Dr. Mark Plotkin, World Wildlife Fund; Barry Flamm, The Wilderness Society; James Pissot, National Audubon Society. The second day of hearings focused on the relationship between biological data collection and its use in conservation. Representatives of the scientific community, the U.S. Fish and Wildlife Service, the States, the Smithsonian Institution and private organizations that deal with biological information were represented on the second day. Testimony was received from Eliot Richardson, Roger Tory Peterson Institute; Dr. Thomas Lovejoy, Smithsonian Institution; Dr. Peter H. Raven, Director, Missouri Botanical Garden; Dr. John D. Buffington, Deputy Regional Director for research, U.S. Fish and Wildlife Service; John Flicker, Vice President, U.S. Operations, Nature Conservancy; and D. Daniel Boone, Coordinator, Maryland Natural Heritage Program. Subcommittee heard testimony from Witnesses and expressed strong support for the need to conserve biological diversity and offered comments on the legislation.

On August 2, 1988, the Subcommittee convened to consider H.R. 4335. The Subcommittee approved on voice vote, a bipartisan amendment in the nature of a substitute offered by Chairman Scheuer and including two amendments proposed by Mr. Henry. The bill as amended was reported to the Committee on Science, Space, and Technology.

3.4—SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

3.4(a)—Nuclear Fission R&D

The Subcommittee on Energy Research and Development held hearings on the Department of Energy's fiscal year 1988 budget request for nuclear fission research and development programs on March 17 and 18, 1987. Testimony was received from 20 witnesses representing the Department of Energy, the Nuclear Regulatory Commission, the Department of Defense, and the National Aeronautics and Space Administration as government witnesses. Other witnesses represented national laboratories, industry, and electric power utilities as well as engineering and manufacturing industries. The Subcommittee Chairman opened the sessions by expressing her concern that the nation has become passive on energy de-

velopment, lulled into a false sense of security as a result of declining fossil fuel prices. She also expressed her concern that the Department has not seriously responded to the Subcommittee's persistent and determined effort to define a well-focused and consistent long-term research and development program in nuclear fission power systems development. The Subcommittee noted the continued lack of agreement between the DOE and the Subcommittee on what constitutes an advanced reactor development program as regards the relative funding and the various technologies.

The Department of Energy's FY 1988 budget request for a nuclear fission research and development program consisted of two major efforts: Civilian Reactor Research and Development, and Space and Defense Nuclear Power Systems. In the civilian reactor R&D area, the Department's proposed program differed from the Subcommittee's recommendation in certain key aspects. Whereas the Department's program would focus on near-term certification of two advanced light-water reactor designs for deployment in the 1990's accompanied by an advanced reactor development activity focused on the liquid-metal reactor, the Subcommittee has proposed, in legislative recommendations submitted in the 99th Congress, a program that would consist of a phase development of inherently safe reactor designs based on a modular high-temperature gas-cooled reactor (MHTGR) design to accompany long-term research efforts in liquid-metal reactor development. The Subcommittee's views as expressed on several occasions does not include intensive R&D investments in light-water reactor designs.

(1) *Nuclear R&D, University Engineering Research.*—The Subcommittee again restated its support for the Department's efforts to improve the university research programs in order to maintain viable nuclear engineering education programs in support of the United States nuclear fission R&D objectives. The Subcommittee was gratified that the appropriations for FY 1988 included \$5 million for this purpose. Committee Publication Number 100-33.

3.4(b)—Conventional Light Water Reactor (LWR Development)

The Subcommittee expressed concern about the great disparity between the funding request for the conventional LWR development programs and that for the MHTGR program.

(1) *Improved Light Water Reactor Development.*—The Subcommittee expressed its view that continued investment of shrinking research and development dollars in the light-water reactor program is not productive. As such, the Subcommittee recommended that the Department's FY 1988 budget request of \$34 million in operating expenses for the light-water reactor program be reduced by \$8,500,000.

(2) *Advanced Light Water Reactor.*—The Subcommittee again expressed its concern that the MHTGR program be funded at a sufficient level for a decision point to be reached on a cost-shared technology demonstration with an appropriate test article. The Subcommittee recommended that an additional \$28 million be authorized over and above the Department of Energy's FY 1988 request of \$5 million for this program. The Subcommittee Chairman expressed her displeasure with the Department's continued thrust to

push competition between the MHTGR and the LMR programs. The Subcommittee expressed its view that these very different technologies in terms of utility interest, deployment timetable, domestic and international market potential, fuel cycle aspects, and for an assortment of other reasons, are technologies considered vital to the United States advanced reactor capability.

3.4(c)—Multi-Megawatt Terrestrial Power Plant (MTP)

The Subcommittee notes with regret that the DOD recommended USAF cancellation of the MTP program during FY 1987. The Subcommittee is not convinced by the DOD rationale for canceling this program which has to be a key element of the Air Force's modern base survivability program.

3.4(d)—Modular High Temperature Gas-Cooled Reactor (MHTGR)

In the Space and Defense Nuclear Power area, the Subcommittee reaffirmed its strong support for the development of compact, space-qualified nuclear reactors for both civilian and defense applications as well as reaffirming its support for preliminary research on development of the multi-megawatt terrestrial power plant (MTP) reactor for use on military bases. This latter program, however, has been cancelled by the Department of Defense.

3.4(e)—Civilian Reactor Development (CRD) Plan

As noted previously, the Subcommittee expressed continued concern that the DOE request for funding of various elements of the civilian reactor development program (CRD) was not consistent with the Subcommittee's perspective on balanced funding as contained in its recommendations.

3.4(f)—Space Nuclear Power Programs

The Subcommittee recommended a reduction of \$6,100,000 in the space and defense power systems program request, in order to provide funds to other programs within the nuclear fission R&D area. The Subcommittee has been reassured through discussion with NASA and the SDIO, the potential users of these space power systems, that their support for these programs will continue through FY 1988 and beyond. It is the Subcommittee's view that development of compact nuclear power systems for space applications is a critical element in this nation's ability to meet the growing power requirements for civilians and defense space missions of the future.

3.4(g)—Technology Transfer Programs

The Committee's continuing support for a strong technology transfer program within the Department of Energy was again emphasized. The need to strengthen industry, university and national laboratory cooperation on technology transfer activities was emphasized during the authorization hearings held in March and again at a field hearing held in Richland, Washington, on October 12, 1987. The Subcommittee Chairman expressed her view that the Department should expedite its granting of class waivers to contractor operators of our major national laboratories. The Subcom-

mittee received testimony from 15 witnesses at the October hearing including representatives from the Department of Energy, industry and universities that participate, in one form or another, in the federally funded R&D activities. The Subcommittee became familiar with an innovative technology transfer effort instituted at the Argonne National Laboratory. This program, which involves the University of Chicago and the Argonne National Laboratory working in concert through a corporation called ARCH, is directed at identifying commercializable technology innovations developed at the Argonne National Laboratory and establishing mechanisms by which this technology can be presented to the private sector to develop marketable products. Other technology transfer related activities instituted at national laboratories were also reviewed, including the interests of the Martin Marietta Company at Oak Ridge National Laboratory in establishing a technology transfer program that would expeditiously move innovations from the laboratory to the private sector. Although most of the witnesses at the Subcommittee hearings on the subject indicated that the federal technology transfer programs are generally effective, there was some concern expressed by certain witnesses that either through a lack of understanding on their part or through restrictive legislatively-mandated requirements, small entrepreneurial companies were having difficulty in fully realizing the economic potential of cooperative activities utilizing technology at the national laboratories.

3.4(h)—Nuclear Waste Management

(1) *General and Authorization Oversight.*—The Subcommittee convened a hearing on March 19, 1987, on the proposed FY 1988, 1989, and 1990 budgets in the nuclear waste management area within the Department of Energy. The programs in this area include high-level radioactive waste disposal financed through the Nuclear Waste Fund, generic research and development activities on the disposal of high-level nuclear wastes which is funded by the government through appropriations, remedial action activities demonstrating clean up efforts at various sites throughout the country, and the West Valley Demonstration Project in New York.

The Subcommittee subsequently marked up the proposed Department of Energy budget on March 25, 1987, and in regard to the Nuclear Waste Fund activities, noted its serious concern about the loss of political consensus supporting the continuation of this program. The Subcommittee concluded that the present repository program should be narrowed to one site and that Congress should enact reform legislation before continuing with the existing program. The Subcommittee found that none of the goals of the Nuclear Waste Policy Act were being achieved by the current program, and yet the program activities were being conducted at tremendous cost to utility ratepayers. The Subcommittee therefore, directed the termination of ongoing activities at the Texas and Washington State sites and directed the Department of Energy to proceed with characterization of a repository at the Yucca Mountain site in the State of Nevada. The Subcommittee expressed its position that Nevada be offered an incentive program to host the highly contro-

versial repository, and that such incentive program would be in the best interests of the nation.

Concerning the West Valley Demonstration Project Act, the Subcommittee directed the Department of Energy to choose the most cost-effective decontamination and decommissioning option that will best protect the public health and safety and the environment and that will conform to the directives of the West Valley Demonstration Act and the National Environmental Policy Act.

(2) *Nuclear Waste Policy Act of 1982: Progress and Problems.*—The Subcommittee is gratified to note that the Congress enacted revisions to the Nuclear Waste Policy Act of 1982 in the FY 1987 Budget Reconciliation Act. This legislation conforms almost entirely to the recommendations of the Subcommittee. The Committee also takes note that the incentive program sponsored in the Act is very similar to the incentive program that the Committee on Science and Technology recommended to the full House of Representatives in the 97th Congress in its Nuclear Waste Policy legislation, H.R. 5016. Although this approach was rejected at the time, the Committee supports the thrust of the Reconciliation legislation that effectively adopts the recommendations of this Committee from 1981.

In the remedial action and waste technology program, the Subcommittee recommended continuing the liquid-fed ceramic melted program and the by-products utilization program, both of which had been proposed for termination.

3.4(i)—Uranium Enrichment

The Subcommittee convened a hearing on March 24, 1987, on the proposed FY 1988 Department of Energy budget for the uranium enrichment program. Several areas of concern were noted during these hearings and were the subject of subsequent markup of the proposed budget.

The Department of Energy's principal problem had been its inability to price enrichment services at a level which will allow it to compete with foreign enrichment service companies. The threat of serious erosion of domestic and international business with the Department of Energy and the subsequent escalation of the unit costs of enrichment services is cause for serious concern in the program and the Congress. The Subcommittee noted that enrichment business is an important national asset that must be protected at the peril of national security and high government appropriations in the future.

The Subcommittee recommended a \$100 million Atomic Vapor Laser Isotope Separation (AVLIS) program for FY 1988. The Committee noted its disappointment at the Department's zero funding recommendation for such an important part of the enrichment program's future.

The Committee noted that without the AVLIS technology, the \$4 billion in international trade from the U.S. enrichment business up to the year 2000 will be lost almost entirely to foreign nations, perhaps even including the Soviet Union. Additionally, U.S. utilities will rely on imported nuclear fuel supply for decades, turning a positive contributor to the Nation's balance of trade to a contribu-

tor to the Nation's trade deficit. The Committee noted that the enrichment services program is important for our defense programs and it cannot be allowed to terminate its services to this government sector even if there are no longer sales to private customers because of poor business decision-making. Thus, in the interest of minimizing government expenditures in the long term, and in the national security interests of the United States, the Subcommittee recommended that this program be continued to and through deployment of the AVLIS technology.

The Committee rejected the Department's proposed repayment to the Federal Government of excess enrichment revenue because the enrichment business is on the brink of bankruptcy. This unfortunate situation has resulted partly from decision-making in the administration of the program, and partly from legal constraints on the setting of competitive prices for enrichment services. The Subcommittee believes it would be an unwise decision to jeopardize the program by mandating repayments contrary to good business judgment.

The problem of international competition has somewhat ameliorated due to the declining value of the dollar in international trade markets. Additionally, the Subcommittee notes that the Department of Energy has recently solved a significant problem in the payment of excess cancellation charges to the Tennessee Valley Authority and thus has reduced the budgetary impact of these non-productive payments from a shrinking revenue source.

3.4(j)—Byproducts Utilization (Subcategory of Remedial Action & Waste Technology)

The Committee initiative in Byproducts Utilization began in FY 1986. The Subcommittee is pleased that the initiative has gone forward and recommended an additional \$5 million to continue the activity in FY 1988, and to encourage private participation in the development of food irradiators.

The Subcommittee also authorized \$500,000 to fund a study by the National Academy of Sciences to review the toxicological data concerning foods treated by irradiation, identify and inconsistencies in the data, and to identify patterns and summarize experimental results.

3.4(k)—Clean Coal Technology Demonstration Program

In 1985 the Congress initiated the Clean Coal Technology Demonstration program using some of the remaining funds from the Synthetic Fuels Corporation Reserve Fund. The program seeks to demonstrate new clean coal technologies that will enable the U.S. to utilize the vast coal reserves in an environmentally benign manner. The program is a cost-shared cooperative effort between the federal government and the industrial developers of the technology, at a percent to be negotiated by the Department of Energy and the partner, but not less than 50%. To date, seven of the original nine selectees have successfully negotiated the partnership agreements with the Department.

The Science, Space, and Technology Committee has been supportive of the program and has held oversight hearings on the program

since its inception. The Energy Research and Development Subcommittee endorsed the Department of Energy's budget request of \$50 million for FY 1988.

The Continuing Resolution on Interior Appropriations for FY 1988 contained \$50 million for the Clean Coal Technology Programs in FY 1988 and \$525 million in FY 1989.

3.4(l)—Fossil Energy

The Subcommittee held hearings on February 26, and March 4, 1987, on the proposed DOE budget request for fossil energy research and development and the clean coal technology demonstration program. Testimony was received from DOE, academia and industry. The DOE budget request was a decrease of approximately \$40 million from the FY 1987 appropriated levels. After the Subcommittee received testimony, it determined that the funding level was inadequate.

The fossil research and development budget is divided into three sections: coal, petroleum, and gas.

Coal is the largest category within the fossil R&D activities. The Subcommittee recommended an authorization of \$207,025 for coal R&D to be allocated as environmental control technology and coal preparation—\$42.0M; Advanced Research and Technology Development—\$32.2M; Coal Liquefaction—\$11.725M; combustion systems was reduced by \$6M for total of \$15.6M due to Subcommittee concerns with the Limestone Multistage Burner (LIMB) project and the DOE management role. In the fuel cells programs, the Subcommittee recommended an authorization of \$26.5M; heat engines were authorized for \$21.3M; the Subcommittee endorsed the DOE request to close out the underground coal gasification and did not recommend funding the activity in FY 1988; MHD was allocated \$35M; surface coal gasification was allocated \$22.7M.

The Subcommittee authorized \$31.5M for petroleum R&D activities which was an increase of \$19,245,000 above the DOE request. Major program emphasis was placed on enhanced oil recovery with \$17.6M allocated for those activities.

The DOE submitted a budget request for gas R&D of only \$1.6M. The Subcommittee determined that the level was inadequate to continue any meaningful activity and recommended an increase of \$8.4M for a total authorization of \$10M.

The Continuing Resolution on Interior Appropriations for FY 1988 contained \$340 million, roughly \$20 million more than recommended by the Subcommittee. Committee Publication Number 100-38.

3.4(m)—Conservation R&D

The Subcommittee held a hearing on March 11, 1987, to receive testimony on the DOE FY 1988 budget request for conservation research and development activities. The Subcommittee's jurisdiction within conservation includes Buildings and Community Systems, Industrial Conservation, Multi-sector activities, Policy and Management, State and Local programs and facilities. The subprograms of Analysis and Technology Transfer, Implementation and Deployment, Policy and Management, National Appropriate Technology

Assistance Service, and State and local programs have shared jurisdiction with the Committee on Energy and Commerce.

In Buildings and Community systems, the Subcommittee authorized \$27.5 million, approximately level funding at FY 1987 appropriated levels, but an increase of \$15 million above DOE-requested levels. In Industrial activities, the Subcommittee authorized \$34.8 million, again bringing the funding level near FY 1987 appropriated levels while increasing the DOE levels by \$18.8 million. The Subcommittee again expressed its interest in the Steel Initiative and provided \$9 million within the Process Efficiency subprogram to continue the program.

The Subcommittee brought the multi-sector activities back to FY 1987 levels by authorizing \$27.7 million, an increase of \$7.3 million above DOE-requested levels. The Subcommittee authorized \$92.0 million for all conservation activities, an increase of \$42.1 million above the DOE FY 1988 budget request.

3.4(n)—Solar/Renewables

The Subcommittee held a hearing on March 11, 1987, to receive testimony from the DOE, academia, national laboratories and the private sector on the budget request for FY 1988. The renewable program contains the Subprograms of solar buildings, photovoltaics, solar thermal, wind energy, ocean thermal energy and biomass. Geothermal energy and electric energy systems and energy storage systems also fall within the renewable category.

The DOE FY 1988 request for renewable energy was \$101.1 million. The Subcommittee determined the requested funding to be inadequate to continue renewable energy development at a reasonable pace and increased the authorization by \$38.9 million for total authorization of \$140.0 million. The Subcommittee recommendations for funding were as follows: solar buildings—\$6.25 million; photovoltaics—\$25.0 million; solar thermal—\$17.0 million; bio-fuels—\$15.6 million; wind energy—\$11.0 million, and; ocean thermal—\$3.5 million.

Other solar programs included in the authorization are the Solar Energy Research Institute, Solar International, Solar Technology Transfer, Program Support, Solar Resource Assessment, Capital Equipment and Construction. These programs were allocated \$11.3 million.

Geothermal research and development activities received a Subcommittee authorization of \$22.6 with the \$16.8 million allocated for technology development activities. The \$22.6 million represents an increase of \$6.7 million above the DOE request.

Electric Energy Systems and Energy Storage Systems were authorized \$29.3 million, an increase of \$15.3 million above the DOE request. Electric Energy System received \$12.7 million and Energy Storage Systems \$16.6 million.

3.4(o)—Magnetic Fusion

The Subcommittee acted to increase the Magnetic Fusion budget request in order to strengthen the program with the overall objective of achieving a burning plasma at an earlier date while at the

same time providing for additional support of alternative fusion technologies.

In increasing the budget by adding \$8.0 million to the Compact Ignition Tokamak (CIT) construction project for a total of \$15 million, as well as adding \$7 million to CIT "operating funds," the Subcommittee demonstrated its strong support for this project. However, the Subcommittee is concerned about the management of this unusually complex project.

The Committee also added \$5.0 million for alternative fusion concepts at the Oak Ridge National Laboratory and another \$5.0 million for the Confinement Physics Research Facility at the Los Alamos National Laboratory. Both of these alternatives offer the possibility for advancements in fusion research toward the goal of energy production.

The Continuing Resolution on Appropriations for FY 1988 did not contain additional funding for CIT, but it did include language supporting design and other activities on CIT as a line item at a level of \$8 million.

(1) *International Thermonuclear Experimental Reactor Concerns.*—The Subcommittee believes that there may be some budgetary advantages to U.S. participation in an international Thermonuclear Experimental Reactor Project. However, the Committee is not convinced of the cost benefits of U.S.S.R. involvement in the international Thermonuclear Experimental Reactor project. This fusion device is to be the predecessor to a prototype fusion reactor and thus cooperation with the Soviets should be approached carefully so as to prevent any adverse technology transfer, particularly as regards national security.

(2) *Inertial Confinement Fusion (ICF).*—In recognition of the advancements made in ICF, the Committee added \$5.0 million to the Department of Energy's budget for a civilian applications research effort and for the Department to prepare a comprehensive program plan to carry out this effort.

The Committee recognizes that the University of Rochester, KMS Fusion, Inc., Lawrence Livermore National Laboratory, Los Alamos and Sandia National Laboratories and the Naval Research Laboratory are all engaged in inertial confinement research activities which are relevant to civilian applications.

3.4(p)—Supporting Research and Technical Analysis

The Department's budget submission for FY 1988 for supporting research and technical analysis programs included \$525.8 million for basic energy science programs, \$3.8 million for energy research and analysis, \$13.4 million for university research support, \$5 million for university research instrumentation and \$56.6 million for the multi-program energy laboratory support. The Subcommittee held hearings on March 4 and 18, 1987, primarily focusing on the basic energy sciences program, the university research support program and multi-program energy laboratories-facilities support activities. In addition to the Department of Energy witnesses, the Subcommittee received testimony from six witnesses on the basic energy sciences programs. These witnesses represented national laboratories, universities and industry representatives with direct

participation in these basic energy sciences activities. At the March 18, 1987, hearing on the multi-program laboratories, the Subcommittee received testimony from representatives of the Oak Ridge National Laboratory, the Pacific Northwest Laboratories, the Argonne National Laboratory, Brookhaven National Laboratory, and the Lawrence Berkeley Laboratory. Of critical importance to the Subcommittee's interests were issues related to the plans for new facilities required to meet the needs of the science research programs at the laboratories over the next decade. These facilities included the one-to-two-GEV light-source at the Lawrence Berkeley Laboratory, the six-to-seven-GEV advanced-photon source at the Argonne National Laboratory and the advanced neutron source at the Oak Ridge National Laboratory. In addition to these major facilities, funding required to upgrade existing research facilities at several of the national laboratories was under consideration. A major new enterprise within the basic energy sciences programs was the research and development activities associated with newly discovered high-temperature superconducting materials. The basic energy sciences program is responsible for supporting fundamental research in these areas at the national laboratories. Ten million dollars were reprogrammed in FY 1987 within the material sciences and chemical sciences program elements of the basic energy sciences program to this new area.

Other issues discussed by witnesses included national laboratory-industry cooperation in several research areas, the anticipated role of the Basic Energy Sciences Advisory Subcommittee (BESAC) in determining future directions within the basic energy sciences program and the relative importance of completing construction work on the new light source facilities in order to meet the needs of the broad user community associated with such facilities. The Subcommittee also questioned whether or not witnesses anticipated that the Superconducting Super Collider (SSC) would adversely compete with the construction and operation of these facilities in the basic energy sciences program. The Subcommittee estimated that budget requirements for these facilities would amount to some \$3 billion over the next eight to ten years. Committee Publication Number 100-33.

(1) *X-Ray Lithography Initiative.*—The Subcommittee received testimony from witnesses representing industry, universities and the national laboratories on the importance of initiating a new project that would utilize the compact synchrotron light source in conjunction with advanced technology developed to fabricate high density semiconductor chips suitable for advanced applications for both military and commercial purposes. This technology has been identified as a unique opportunity for the United States to regain a leadership position in the semiconductor industry through the use of advanced technologies in x-ray light source design and the development of masking and fabricating techniques for computer circuits for dimensions of the order of .25 microns. As a result of this testimony, the Subcommittee working with the Appropriations Subcommittee and the Research and Development Subcommittee of the House Armed Services Committee instituted a new program initiative in x-ray lithography that would involve cooperative efforts on the part of the Department of Energy and the Department

of Defense in its doing a rapid development program. The Subcommittee's efforts led to an appropriation of \$10 million within the Department of Energy for this activity as well as a \$15 million within the Department of Defense for FY 1988. It is anticipated that a total of approximately \$100 million will be required over the next three to five years. That would lead to this country's assuming a leadership role in world markets in the manufacturing of 64 megabyte size computer chips utilizing this new technology.

3.4(q)—General Science and Research

The general science and research program within the Department of Energy's FY 1988 budget request includes high energy physics program for which the Department requested \$566.6 million and the nuclear physics program which was submitted at a \$245.1 million request. These figures represented about a 13% increase over the FY 1987 appropriations for these programs. The Subcommittee held hearings on High Energy Physics and Nuclear Physics programs on March 3, 1987. Witnesses from the Department of Energy, the FERMI National Accelerator Laboratory, Stanford Linear Accelerator Laboratory, Brookhaven National Laboratory, and the Department of Energy's High Energy Physics Advisory Panel (HEPAP) provided testimony before the Subcommittee on high energy physics programs. In the nuclear physics area, witnesses representing the Continuous Electron Beam Accelerator Facility, Brookhaven National Laboratory, and the Department of Energy's Nuclear Sciences Advisory Subcommittee (NUSAC) testified before the Subcommittee. Witnesses testified as to the adequacy of the existing funding levels to maintain operation of the major facilities in high energy physics program. These include the TEVATRON at the FERMI National Accelerator Laboratory and the Stanford Linear Collider at the Stanford Linear Accelerator Center. The testimony was also centered on the proposed Superconducting Super Collider (SSC), and its potential impact on the future funding picture for high energy physics. The Subcommittee was impressed by the unanimous support for the SSC exhibited by the high energy physics community. However, the Subcommittee expressed concern that operating funds for existing accelerator facilities at FERMI Lab and the Stanford Linear Accelerator Center should not be jeopardized by the impending funding levels required to build and operate the SSC.

The Subcommittee's concern that the Department funding request for the Continuous Electron Beam Accelerator Facility (CEBAF) was 50% below that required in order to meet realistic construction levels. As the CEBAF cost estimates had already escalated from \$236 million to \$255 million primarily as a result of schedule delays, the Subcommittee was concerned that inappropriate funding levels for this project would significantly delay its completion while continuing to increase its costs. In addition, the Subcommittee received testimony on the need for a new facility in heavy ion research in the nuclear physics program. This facility, the Relativistic Heavy Ion Collider (RHIC) is to be constructed at the Brookhaven National Laboratory. The Department's FY 1988 funding request for this project was estimated to be approximately

\$4.1 million below that needed to maintain a realistic construction schedule for the project. The witnesses expressed the view that this new facility was critical to the development of the nuclear physics program in this country. The Subcommittee has expressed its concern that the Department has not given this project the priority necessary to assure its timely implementation by the early 1990's.

Subsequent Subcommittee action involved reprogramming and redirecting funds within the nuclear physics as well as the high energy physics programs in order to accommodate priority needs and facilities operations and major construction activities. Committee Publication Number 100-39.

(1) *Superconducting Super Collider (SSC).*—The Subcommittee did not explicitly consider the issue of SSC funding for which DOE had requested \$35 million within the budget for High Energy Physics. The Subcommittee implicitly recommended \$35 million for the SSC but with only \$20 million being redirected within the High Energy Physics program and \$15 million being provided in new funding. The Subcommittee rationale was that if SSC is not impacted by other science activities (e.g., TEVATRON and SLC) in FY 1988, "new" money must be provided, and the Administration had committed to that approach. The Subcommittee recommended providing additional funds for TEVATRON and SLC operations.

H.R. 3228, a bill to authorize appropriations for the SSC program was introduced in August, 1987. As amended by the Committee, \$35 million was provided for the SSC program in FY 1988.

3.4(r)—Hydrogen: Fuel of the Future

On September 23, 1987, the Subcommittee on Energy Research and Development held a hearing on hydrogen as a future energy fuel. Hydrogen can be a strong energy link between various energy-consuming options such as coal or nuclear energy sources. It can also be a medium for storage and transmission of energy. However, since hydrogen is nearly non-existent in its free state, it must be produced by using a primary source of energy such as gas, oil or coal. Present production methods are expensive and cannot currently compete economically with other, more readily available fuels. Therefore, a crucial problem to be resolved before the widespread use of hydrogen occurs is the development of a method of production which will significantly reduce production costs.

The hearing focused on how current methods of hydrogen production might be improved and what the expected production costs must be to allow hydrogen to be economically competitive, i.e., a viable energy option.

Testimony was received from government agencies, academia and industry. In addition, testimony was received from Congressman George E. Brown, Jr., and Senator "Spark" M. Matsunaga, sponsors of H.R. 2541 and S. 1296, respectively, the Hydrogen Research and Development Act. The legislation, if enacted, would establish a comprehensive hydrogen research program managed by the Department of Energy and NASA.

Testimony focused on the status of hydrogen production methods using fossil fuels and renewable energy. Witnesses emphasized the beneficial environmental aspects of hydrogen use as compared to

burning fossil fuels, with regard to ozone depletion and acid rain concerns.

3.4(s)—High Temperature Superconductivity

The Subcommittee held a hearing on October 20, 1987, to review the status and development in the area of research on high temperature superconducting materials and their potential applications. The purpose of the hearing was to address four specific questions which were delineated by the Chairman:

1. What is the status of research in these new materials?
2. How does our knowledge of these new materials compare to that of our international competitors?
3. Are the institutional arrangements presently operating within the national laboratories, universities and the private sector adequate to do the job, or are legislative initiatives required?
4. And if so, which would be the critical elements of such legislation?

Eighteen witnesses representing government, industry and academia addressed these four questions and provided insights into how Congress may wish to proceed in the area of superconductivity.

3.4(t)—Geosciences

On July 15 and 16, 1987, the Subcommittee on Energy Research and Development held hearings on Geosciences research for energy resources. The major energy problem which still confronts the United States is a domestic liquid hydrocarbon shortage which threatens the nation's long-term energy security and international competitiveness. Addressing these concerns, the Energy Research Advisory Board (ERAB) prepared a report for the Department of Energy in February, 1987, entitled, "Geoscience Research for Energy Security."

The focus of the hearings was to review the federal programs in Geosciences research, to examine recommendations for research priorities, and to review funding levels and possible organizational and policy changes necessary within the DOE. The ERAB report and recommendations were also discussed.

Testimony was received from government agencies, national laboratories, academia and industry. While there were differing views of the focus of the research and development, it was agreed that a strong geoscience research program at this time would enhance our ability to meet future oil and gas production needs.

The ERAB report cited four basic needs of a comprehensive geosciences research program:

1. Shorter-term (or new) focus on oil and gas exploration and production technologies should receive priority.
2. Establishment of an Office of Geosciences Research.
3. Establishment of six regional oil and gas research centers.
4. Increased funding for the recommended activities to an overall level of \$50 million.

Several recommendations came out of the hearings which the Subcommittee will address in future budget deliberations.

1. DOE should emphasize shorter-term research in oil and gas recovery.

2. A cautious optimism was shared by several witnesses regarding the DOE announcement of the establishment of an Office of Geosciences Research. The announcement was perceived as a first-step, but the witnesses reserved judgment until implementation occurs.

3. The establishment of the six regional research centers received general support but no clear vision of the exact nature of the centers prevailed.

4. Finally, no obvious consensus emerged regarding the proper amount of annual funding required to conduct a well-coordinated geosciences research program.

3.4(u)—Renewable Energy

On July 8 and 9, 1987, the Energy Research and Development Subcommittee held hearings to examine the development status and potential of renewable energy technologies. The Subcommittee was concerned that the low level of funding requested by the DOE for renewable research and development was insufficient to allow the technologies to continue on timely development paths. The Subcommittee also addressed the potential barriers to renewable energy development such as current high technology costs and limited regional applicability. The proper federal role in supporting technology development with regard to international competition was also discussed.

Testimony was received from the Department of Energy, national laboratories and the private sector. Low funding levels were of concern to most witnesses with agreement that FY 1988 projected funding was at the critical level and should be increased. During discussions of private sector-federal government cost-sharing applicability, the representatives from smaller development companies indicated that their industry was too small to participate in substantial cost-sharing.

3.4(v)—Global Prospects for U.S. Coal and Coal Technologies

On July 21 and 23, 1987, the Subcommittees on Energy Research and Development and International Scientific Cooperation held joint hearings on the Global Prospects for U.S. Coal and Coal Technologies. The Subcommittees examined the status of current federal policies affecting the export of strategic national resources and addressed the constraints and benefits of increasing our exports. Major issues affecting U.S. coal and coal technology export potential are the federal governments role in promoting U.S. coals in a package with U.S. coal technologies; trade policies that adversely affect export capabilities; and possible coordination of activities to enhance U.S. trade opportunities.

Testimony was received from government and private sector witnesses.

Testimony revealed several issues which should be addressed to enhance future U.S. coal and coal technology capabilities. In general, the conclusions were: substantial strategic and financial benefits could be realized if U.S. increases exports at this time; the Depart-

ment of Energy's Clean Coal Technology and fossil research and development programs should be an integral part of U.S. efforts to export technology; constraints to increased exports do exist; and current uncoordinated federal policies may result in lost opportunities for U.S. market penetration. Committee Publication Number 100-40.

3.4(w)—Fossil Energy

The Subcommittee held hearings on March 2, and March 3, 1988, on the proposed DOE budget request for Fossil Energy Research and Development and the Clean Coal Technology Demonstration program. Testimony was received from DOE, academia and industry. The DOE budget request representing a decrease of approximately \$186 million from the FY 1988 appropriated levels. After the Subcommittee received testimony, it determined that the funding level was inadequate.

The Fossil Research and Development budget is divided into three sections: Coal, Petroleum, and Gas.

Coal is the largest category within the Fossil R&D activities. The Subcommittee recommended an authorization of \$226 million for Coal R&D to be allocated as Environmental Control Technology and Coal Preparation—\$46 million; Advanced Research and Technology Development—\$30 million; Coal Liquefaction—\$25 million; and Combustion Systems—\$22 million. In the Fuel Cells program, the Subcommittee recommended an authorization of \$31 million; Heat engines were authorized for \$18 million; Underground Coal Gasification—\$0.271 million; MHD was allocated \$35 million; and Surface Coal Gasification—\$18 million.

The Subcommittee authorized \$31 million for Petroleum R&D activities which was an increase of \$10 million above the DOE request. Major program emphasis was placed on Enhanced Oil Recovery with \$18 million allocated for those activities.

The DOE submitted a budget request for Gas R&D of only \$2 million. The Subcommittee determined that the level was inadequate to continue any meaningful activity and recommended an increase of nearly \$10 million for a total authorization of \$12 million.

The Interior and Related Agencies Appropriations Conference Report 100-862 to accompany H.R. 4867 contained \$381 million, roughly \$18 million more than recommended by the Subcommittee.

3.4(x)—Energy Conservation R&D

The Energy Conservation R&D activities authorized by the Committee include the Buildings and Community Systems programs of Building Systems, Community Systems, Technology and Consumer Products and Program Direction. Activities within the Industrial Energy category are Waste Energy Reduction, Process Efficiency and Cogeneration. The Multisector programs include the Energy Conversion and Utilization (ECUT), Inventors Program, Technology Assessment and Transfer, and Program Direction. The Committee recommended a total authorization for Energy Conservation activities of \$84,167,000, an increase of \$34,370,000 above the DOE request of \$49,797,000.

In Buildings and Community systems, the Subcommittee authorized \$27.5 million and in the Industrial program activities—\$29 million. The Subcommittee provided \$2 million within the Process Efficiency subprogram to continue the Steel Initiative.

The Subcommittee authorized the Multisector activities at \$28 million.

3.4(y)—Solar/Renewables

The Subcommittee held a hearing on Solar Energy on March 8, and on Other Renewables on March 9, 1988. Testimony was received from the DOE, academia, national laboratories, and the private sector on the budget request for FY 1989. The Renewable program contains the subprograms of Solar Buildings, Photovoltaics, Solar Thermal, Wind Energy, Ocean Thermal Energy and Biomass. Geothermal Energy and Electric Energy Systems and Energy Storage Systems also fall within the Renewable category.

The DOE FY 1989 request for Renewable Energy was \$78 million. The Subcommittee determined the requested funding to be inadequate to continue Solar Energy Development at a reasonable pace and increased the authorization by \$24 million for a total authorization of \$102 million. The Subcommittee recommendations for funding were as follows: Solar Buildings—\$3.7 million; Photovoltaics—\$34 million; Solar Thermal—\$22 million; Biofuels—\$15 million; Wind Energy—\$11 million; and Ocean Thermal—\$3 million.

Other Solar programs included in the authorization are the Solar Energy Research Institute, Program Support, Solar Resource Assessment, Capital Equipment and Construction. These programs were allocated \$12 million.

Geothermal Research and Development activities received a Subcommittee authorization of \$26 million, an increase of \$10 million above the DOE request.

Electric Energy Systems and Energy Storage Systems were authorized \$36 million, an increase of \$10 million above the DOE request. Electric Energy Systems received \$19 million and Energy Storage Systems \$17 million.

The total Committee authorization for Renewable Energy was \$163.5 million for FY 1989.

3.4(z)—Nuclear Fission R&D

The Subcommittee on Energy Research and Development held hearings on the Department of Energy's FY 1989 budget request for Nuclear Fission Research and Development programs on March 16 and 17, 1988. Testimony was received from 19 witnesses representing the Department of Energy, the National Aeronautics and Space Administration, the Nuclear Regulatory Commission, the Strategic Defense Initiative Office, the Air Force Systems Command, the Tennessee Valley Authority, the national laboratories and industry, including representatives from the public utilities. Chairman Lloyd opened the hearings by noting that the Department of Energy's budget request for FY 1989 which amounted to \$352 million for Nuclear Fission R&D programs, provided a disproportionate share of the funding to near-term light water technology

and not enough for the intermediate-term high Temperature Gas Cooled Reactor technology. She again emphasized her belief that domestic reactor orders in the future are likely to be for the next generation of reactor designs that are modular as well as inherently safe, both in terms of public safety and financial investment. She also noted that the share of the proposed budget provided for development of power sources for use in space will meet a critical need for future civilian and defense missions in space.

In FY 1989, the Department of Energy's budget request for Nuclear Fission Research and Development programs was composed of five areas of work, including the development of nuclear electric power systems for space, the operation and maintenance of facilities at the national laboratories, Liquid Metal and High Temperature Gas Reactor Development, the production and testing of Isotope Power Systems for use in space and improved Light Water Reactor Research. The Subcommittee expressed its observation that critical funding problems have developed in the Nuclear Fission programs as a result of a number of factors, chief of which is the lack of a strong commitment both in the Administration and in the Congress to a "National Energy Policy". The Committee's recommendation for FY 1989 funding for Nuclear Fission R&D amounted to \$409,700,000, which was about \$58 million above the Department's request.

(1) *Light Water Reactors.*—The Committee reemphasized its view as expressed in the first session of the 100th Congress that light water reactor technology represents near-term reactor investments that are more appropriately the responsibility of the private sector. In this regard, the Committee deleted \$2.5 million recommended for certification in other work on advanced 1,300 megawatt reactor designs.

(2) *Advanced Reactor R&D.*—The Committee again expressed strong support for the Modular High-Temperature Gas-Cooled Reactor program by increasing the Department's recommended budget request by \$27.3 million, bringing the total for the program to \$35 million. The Committee also directed the Department to conduct a peer review of its shift in emphasis in the Liquid-Metal Reactor (LMR) program from mixed-oxide fuels to metal fuels. The Committee expressed its opinion that such a review is necessary in order to verify that the correct course of action has been taken by the Department of Energy to convert the LMR fuel cycle from a mixed-oxide to a metal fuels cycle.

(3) *Space and Defense Power Systems.*—The Committee expressed its view that successful and productive efforts to establish a strong interagency cooperative program to develop the SP-100 space reactor would be jeopardized by the budget reductions that were expected in the FY 1989 appropriations actions. The Committee also expressed strong support for the National Aeronautics and Space Administration's new initiative called "PATHFINDER," a program which included the development of space nuclear reactors as part of its Advanced Technology Development program. The Committee did, however, impose an \$8 million general reduction across the Space and Defense Power Systems program in order to accommodate program priorities within the Nuclear Fission R&D efforts

and while recognizing the overall budget reduction pressure on the growth of federal FY 1989 Science and Technology programs.

3.4(aa)—Basic Research User Facilities

In the Department of Energy's FY 1989 budget request, a new budget category was introduced entitled "Basic Research User Facilities." This category provided separate delineation of funding for facilities associated with the Department's Basic Energy Science programs, High-Energy Physics programs, and Nuclear Physics programs. The purpose of separately identifying facility funding for these program areas was based on the Administration's concern that a strict separation of program support funding from facility construction and operating costs should be maintained. The Committee generally agreed with the premise that this funding separation was justified. Although eventually rejected by the Appropriations Committee, the funding recommendations made by the Committee recognized the Department's separation of facilities from major program support in General Sciences and Basic Energy Science programs.

3.4(bb)—Supporting Research and Technical Analysis

The Department's Supporting Research and Technical Analysis program is comprised of seven subprogram elements, the largest of which is the Basic Energy Science program. Other elements of this category include Energy Research Analysis, University Research Support, University Research Instrumentation program, Energy Laboratories—Facility Support program, Advisory and Oversight program direction, and the Strategic Facility Utilization program. The Committee's total recommendation for Supporting Research and Technical Analysis increased the Department's request of \$612,140,000 to \$727,104,000.

(1) *Basic Energy Sciences.*—The Subcommittee held hearings on the Basic Energy Science program on March 23, 1988. Eight witnesses representing the Department of Energy, the Basic Energy Sciences Advisory Committee (BESAC), and the national laboratories presented testimony on various aspects of the Basic Energy Science program within the Department of Energy. The Committee was concerned that funding requested for major existing as well as new facilities in the FY 1989 budget request was not adequate. Chairman Lloyd noted that the Basic Sciences programs within the Department of Energy Office of Energy Research represents one of the most important national scientific efforts funded by the Federal Government. Within this program, pioneering research in the area of high-temperature superconductivity is being conducted. In addition, new technologies and instruments of research are being developed to analyze materials, chemical processes and other phenomenon critical to our energy future. It is also through these programs that scientists and engineers at our national laboratories and our universities make discoveries which expand our knowledge and lead to new technologies and new energy resources.

The Department's request for the Basic Energy Sciences programs in FY 1989 is contained within the overall budget category entitled "Supporting Research and Technical Analysis." The re-

quest for this program was \$612 million of which more than 84% was to be allotted for the Basic Energy Sciences programs. The request for FY 1989 was \$26 million over the FY 1988 appropriated levels, excluding construction initiatives which were funded within the Basic Research User Facilities program. This figure represented approximate 5% increase and the Committee was concerned as to whether or not this increase would be adequate to meet the tasks before the nation in Basic Energy Sciences research. In particular, Chairman Lloyd was concerned that the request did not include funding for the Subcommittee's X-Ray Lithography initiative which was instituted in FY 1988. Also, funding for the Advanced Photon Source, a major new user facility to be built at the Argonne National Laboratory was also greatly under-funded within the President's budget request given that this facility is a new start with an estimated cost of over \$400 million.

The Committee's recommendation for the Basic Energy Sciences programs provided for an increase of \$47,900,000 over the FY 1989 DOE budget request of \$375,662,000. The programmatic increases were to be allocated among the Material Sciences, Chemical Sciences, Applied Mathematical Sciences, Engineering Research, and Geosciences Research program elements of the Basic Energy Sciences program. In addition, the Committee recommended an increase of \$37,100,000 over the DOE's FY 1989 request of \$140,483,000 for the Basic Research User Facilities element of the Basic Energy Sciences program.

(2) *University Research Support.*—The Committee again expressed its view that it is essential to provide a strong university thrust in nuclear engineering research. The Committee recommended \$10 million to be provided for Nuclear Engineering Research and Education. In addition, the Committee recommended \$1 million for a pilot program of summer science camps at universities to be administered by the Oak Ridge Associated Universities organization in order to enhance student interest in the sciences and technology curricula at the universities.

3.4(cc)—General Sciences Program

The General Sciences program within the Department of Energy is divided into two parts; (1) High-Energy Physics and (2) Nuclear Physics programs. The Subcommittee held hearings on the overall General Sciences programs on March 30, 1988. The Subcommittee received testimony from nine witnesses representing the Department of Energy, the High-Energy Physics Advisory panel, the Nuclear Sciences Advisory Committee, the major accelerator laboratories, and the national laboratories. The Subcommittee reviewed the Department's request for \$830 million to cover both programmatic and facility operations within the High Energy and Nuclear Physics programs. Also included within the General Science programs is the Superconducting Super Collider (SSC) project for which the Department requested \$363 million in FY 1989. In opening the hearing, Chairman Lloyd expressed concern that the Department's budget request did not include funding for the Relativistic Heavy Ion Collider (RHIC) to be constructed at the Brookhaven National Laboratory. In addition, the request for the Continuous Electron

Beam Accelerator Facility (CEBAF) in Newport News, Virginia, was significantly under-funded again the Administration's FY 1989 budget proposal. This was an issue which was raised in the first session of the 100th Congress. The Subcommittee was also concerned that funding for facilities presently in operation such as Tevatron and the Stanford Linear Collider must not be jeopardized by the need to increase funding for the Superconducting Super Collider.

Including the Department's request for the SSC, the total budget request for FY 1989 for the General Sciences programs amounted to \$1,197,116,000. The Committee's recommendation reduced this request to a figure of \$1,026,816,000 through reductions in the SSC program. The Committee recommended \$147,700,000 for the Superconducting Super Collider in FY 1989, a figure which was \$215.3 million below the Department's request. The Subcommittee's recommendation expressed the concern of Congress that construction for the SSC not commence until the next Administration has a chance to review the overall program.

3.4(dd)—Superconducting Super Collider (SSC)

On March 22, 1988, the Committee on Science, Space, and Technology held a hearing to review the SSC site selection process, the status of the SSC Magnet Development program, and the funding requirements to support both of these activities for the remainder of FY 1988 and FY 1989. The Committee received testimony from Members of Congress, the Department of Energy, the National Academy of Sciences, the National Academy of Engineering, the SSC Central Design Group, and representatives from industry. In outlining the reasons for the full Committee hearing, Chairman Roe stated that the Committee wanted to establish a record that would clearly delineate the processes and methods used in selecting the seven states that made the "Best Qualified List" in the National Academy's recommendation to the Department of Energy. Mr. Roe also noted that the prospects for international cost-sharing for the Superconducting Super Collider is of great interest to the Members of Congress. The Committee was concerned that the Department's public statements forecasting very high levels of foreign cost-sharing may have been overly optimistic.

The Committee expressed its view on the SSC in H.R. 4505, the Department of Energy Civilian Energy Research and Development Programs Authorization Act for FY 1989. In the report accompanying H.R. 4505, the Committee directed the Department of Energy to initiate competitive procedures to select a contractor for the Superconducting Super Collider and for the Secretary of Energy to define the responsibilities of the contractor to include overall management and direction of the day-to-day activities associated with the project. In addition, the Committee directed the Secretary of Energy to initiate competitiveness procedures to involve industry in several aspect of the program including, but not limited to, magnet development and manufacturing, technical systems development and manufacturing, and architect/engineer and construction manager activities. The Committee also outlined, in separate sections of the bill (H.R. 4505) other instructions to the Secretary

regarding eligible contract recipients, foreign manufacture of components and systems, requirements on consulting with the Committee regarding foreign participation in the SSC project, conflict of interest provisions that prohibit the Secretary from entering into a contract to manage the operation of the SSC project with any person who has been in a prior position to influence the management or direction of the SSC project. The Committee also instructed the Department to enter into an agreement with the National Research Council to establish a Superconducting Super Collider Independent Cost Review Group.

3.4(ee)—Magnetic Fusion Energy

The Subcommittee held hearings on the Magnetic Fusion Energy program and budget on March 30, 1988. Subsequently, the Subcommittee and then the Committee marked up the DOE authorization bill. The Committee acted to increase the Magnetic Fusion budget request to strengthen the program with the overall objective of achieving a burning plasma at the earliest reasonable date. In particular, \$8 million was added to confinement systems operations and \$12 million for construction for the Compact Ignition Tokamak (CIT). The Committee also added \$5 million for Advanced Development and Technology to advance the development of enabling technologies, especially electron cyclotron radio frequency heating.

The 1989 Energy and Water Development Appropriations Bill did not contain additional funding for the Compact Ignition Tokamak or the Advanced Development and Technology. In fact, the Appropriations' level for CIT was reduced by \$4 million with no funding for construction provided in 1989.

3.4(ff)—Other R&D Programs

On March 29, 1988, FY 1989 the Subcommittee continued the DOE authorization hearing for programs not discussed in previous hearings. Testimony was received from the DOE, private industry, and academia. The topics included Nuclear Physics, X-Ray Lithography, Science Education needs, the need for a National University program in multi-phase flow and Petroleum and Conservation R&D activities.

A panel of witnesses discussed the status of the Committee's X-Ray Lithography initiative. Witnesses urged the establishment of a comprehensive program plan relying on industry and government collaboration. The plan should include designation of a lead agency, schedules and a full funding profile. Witnesses also discussed the critical need to focus on the scientific education of U.S. students. Recent comparisons of scientific achievement of U.S. high school students with their foreign contemporaries showed U.S. students ranking lower. Reasons for decline included less federal funding available for academic research including funds to purchase and refurbish laboratory equipment. Additionally, fellowship programs and university summer science camps should be encouraged to stimulate interest in science.

*3.4(gg)—The Renewable Energy and Energy Conservation
Commercialization and Development Act (H.R. 4226)*

Background

The Department of Energy Renewable Energy and Energy Conservation R&D program funding has severely declined since its 1982 peak. While funding for other Civilian Energy programs has also declined, support for Renewables and Conservation is at a relatively low level, allowing only a small base program in most of the activities.

Legislative History

H.R. 4226 was introduced on March 22, 1988, and jointly referred to the Committee on Science, Space, and Technology's Subcommittee on Energy Research and Development (ERD) and the Committee on Energy and Commerce's Subcommittee on Energy and Power. The ERD held a hearing on June 30, 1988, and received testimony from the following witnesses: Dr. Harold Hubbard, Director, Solar Energy Research Institute; Dr. Peter Blair, Energy and Minerals Program, Office of Technology Assessment; Mr. Scott Sklar, Executive Director, Solar Energy Industries Association; Dr. T. W. F. Russell, Director, Institute of Energy Conversion, University of Delaware; Mr. Marc Ledbetter, American Council for an Energy Efficient Economy; and Mr. Geoff Grandall, National Association of Regulatory Commissioners.

The Subcommittee reported H.R. 4226 as amended on September 22, 1988.

3.4(hh)—State of the U.S. Oil and Gas Industry

On May 13, 1988, the Subcommittee held a field hearing on the state of the U.S. Oil and Gas Industry. The hearing was held in Marshall, Texas. The hearing was precipitated by the Subcommittee's concerns over declining oil and gas R&D budgets and the effect of oil and gas prices, particularly as they impact independent producers.

Recent changes in the income tax law that eliminated incentives for oil and gas drilling and production coupled with low oil prices have severely impacted the independent producers ability to compete with large companies. Recommendations to return some income tax incentives, institute an oil import fee and to limit crude oil imports were discussed as ways to assist struggling independents.

Economic dislocations caused by oil price declines were discussed in terms of the effect on small companies. Instead of waiting for prices to increase, witnesses recommended that we must develop new technologies to find new reserves and for increasing production from existing fields. Increased funding for R&D was called for principally because, while large companies do fund R&D, their research results are not necessarily beneficial to small companies.

3.4(ii)—High Temperature Superconductivity and Technology Transfer

On June 23, 1988, the Energy Research and Development Subcommittee held a hearing to examine the status of federally sponsored programs in high temperature superconductivity applications, its impact on technology transfer activities of the Department of Energy's National Laboratories, and the degree to which the programs had benefited the private sector. Representatives from the Departments of Energy and Defense, Oak Ridge National Laboratory, Argonne National Laboratory, and Los Alamos National Laboratory as well as individuals from private industry testified on this day.

There was a general consensus that the federally sponsored high temperature superconductivity applications programs were well coordinated and supporting R&D across a range of appropriate technologies, and that a substantial amount of this activity would be of value to the private sector. However, two major problems were identified in this hearing:

- (1) The DOE approach to technology transfer at the National Laboratories still posed major barriers to completing cooperative agreements with U.S. companies to transfer technologies developed in the laboratories, and

- (2) The funding for R&D in this area needed to be more reliable. A procurement freeze, instituted by the Department of Defense because of cost overruns in major activities, was having a major and potentially severe impact on the ability of many companies to participate in the program.

Subsequent to the hearing, the freeze was lifted, at least with regard to R&D procurements. A contributing factor to the lifting of the freeze was the strong response of Congress, including several Members of the Committee, expressing concern on the possible negative impact on the ability of U.S. industry to compete in the high temperature superconductivity arena.

The effectiveness of the technology transfer activities of the DOE National Laboratories was assessed by the Subcommittee in a hearing on July 27, 1988.

3.4(jj)—Establishing a Uranium Enrichment Corporation

On October 6, 1988, a hearing was held to look into the feasibility of establishing a separate uranium enrichment corporation to conduct the uranium enrichment business now operated in the Department of Energy. Testimony was received from the Department of Energy, private interest groups, and industry.

Three bills, H.R. 4489, H.R. 4934, and 4975 all "The Uranium Revitalization and Enrichment Act of 1988," have been introduced to create an enrichment corporation and testimony focused on the pending legislation and the costs and benefits of various approaches as well as the problems that may be encountered if various provisions are enacted into law.

3.5—SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY

*3.5(a)—Federal Information Policy Mechanisms**Background*

The Federal Government is the largest producer, consumer, and disseminator of information in the country. It is also the most important entity in the field of scientific and technical information. Yet, it is difficult to point to a coherent federal policy regarding scientific and technical information.

The Subcommittee's interest in information policy dates back well over a decade. In the National Science and Technology Policy, Organizational Priorities Act of 1976, the Committee attempted to establish a mechanism for resolution of issues in information policy by giving the Office of Science and Technology Policy lead responsibility for ensuring that the various agencies were coordinating their efforts in this area. Unfortunately, no Administration since that time has viewed matters of information policy as having high priority. During the 1980's matters have slipped from bad to worse when fiscal concerns have been the driving force behind federal information policy. Major budget cuts affected both quantity and refinement of data while major outlets of federal information such as the National Technical Information Service (NTIS) achieved a fraction of their potential because they were denied the funds needed to modernize. Repeated attempts to privatize NTIS have also taken their toll.

Summary of the Hearing

The Subcommittee, through hearings on July 14 and 15, 1987, conducted a survey of the major current information policy issues. Also considered were the bills: H.R. 2159, which would change the National Technical Information Service into a wholly owned government corporation; and H.R. 1615, which would pull government information functions together into a Government Information Agency. A recent Executive Order dealing with the collection and dissemination of foreign scientific and technical information was also considered.

Mr. Melvin Day, who has held a variety of key federal information positions, including Deputy Director of the National Library of Medicine, opened the hearing with an overview of the last 20 years of federal information policy. Mr. Harold Shill of the American Library Association, John Shattuck of the Association of American Universities, Dr. Alvin Trivelpiece of the American Association for the Advancement of Science, and Professor Martin Weingartner of the Council of Scientific Society Presidents presented the views of the major users of scientific and technical information. Mr. Kenneth Allen of the Information Industries Association, Dr. James Seals of Chemical Abstracts Service, and Mr. Vincent Barabba of General Motor's Market Research Division presented the views of the information industry and what they felt their role vis-a-vis the government should be. On the second day, Mr. James Fossedal, the Superintendent of Documents, began the discussion of the same questions from the federal point of view. He was followed by Mr. James Pierce, National President of the National Federation of

Federal Employees, and by spokesmen for each of the departments and agencies which have a role in collection and dissemination of scientific information from around the world. Committee Publication Number 100-36.

3.5(b)—Superconductivity (H.R. 3024, the National Superconductor Manufacturing and Processing Technology Act of 1987; H.R. 3048, the National Superconductivity and Competitiveness Act of 1987; and H.R. 3217, the National Superconductivity, Competitiveness and National Security Act of 1987)

Background

On October 7, 1987, the Subcommittee on Science, Research and Technology and the Subcommittee on Transportation, Aviation and Materials held a joint hearing on three bills pertaining to superconductivity activity in the Federal Government. The bills focus on the issue of a national initiative for superconductivity research, including the appropriate priorities and directions of various federal agencies, collaboration between the public and private sectors, organizational concerns, and appropriate funding levels over a five-year time period. Witnesses included representatives from the National Science Foundation, National Critical Materials Council, the National Bureau of Standards, the Department of Defense, the Department of Energy, and the National Academy of Sciences. Committee Publication Number 100-57.

3.5(c)—The Role and Balance of Federal R&D Support

Background

The Federal government plays a pivotal role in the encouragement and support of research and development in the United States. The goal of this investment is the growth of the scientific and technological knowledge base which, in turn, leads to such practical benefits as new opportunities for economic growth and enhanced national security. The Federal government allocates research support through agencies which may be categorized as having defense or non-defense missions.

Recently, the balance between federal research and development support for defense and civilian purposes has shifted significantly in favor of defense. In constant dollars, defense R&D has grown from 51 percent of the federal R&D budget in 1980 to 71 percent in 1986. Over the same period, federal support for civilian R&D declined by 6 percent.

This funding trend raises questions about whether civilian research needs are being neglected with possible adverse effects for the U.S. economy. The U.S. currently spends less on civilian R&D as a fraction of GNP than its international competitors. Although commercial spinoffs from military research occur, most of the increases in the defense R&D budget have been for the development of specific weapons systems, benefiting a relatively few industries. The basic research portion of the defense R&D budget, which traditionally has been the main source of technological innovations and commercial spinoffs, is small and has declined as a percentage of the total budget.

Summary of Hearing

On June 18, 1987, a hearing was held to review the effects of the current balance of federal R&D support on the economy, including the effects of commercial spinoffs from military research, and on the training and allocation of scientific manpower. Witnesses included representatives from federal research-funding agencies, academe, and the Center for Defense Information, a group critical of the current funding balance. The witnesses covered the spectrum of positions on the balance issue and placed on the record the basic arguments, pro and con. The witnesses expressed contradictory views on whether the current emphasis on defense R&D has significantly influenced the recent decline in U.S. economic competitiveness in the world and on whether significant commercial spinoffs have resulted from defense R&D. The panel on scientific manpower, while again presenting conflicting views, provided evidence from a recent National Academy of Engineering study that the recent expansion in defense research has not deprived the civilian sector of scientists and engineers. Committee Publication Number 100-44.

3.5(d)—The Role of Science and Technology in Competitiveness

Background

The Subcommittee on Science, Research and Technology has been concerned with the subject of innovation and productivity for the past four Congresses, and has held numerous hearings on this subject. For the most part, the same recommendation has surfaced in all these hearings: the United States must place a higher priority on technology development, innovation, manufacturing productivity, and commercialization of technological products at the federal level.

Focus of the Hearings

In an effort to address the issue, the Subcommittee held three days of hearings to explore various legislative proposals concerned with the federal role of science and technology in competitiveness. Among the bills discussed were: S. 907, the Technology Competitiveness Act of 1987, introduced by Senator Hollings, and H.R. 2068, the National Bureau of Standards and Industrial Competitiveness Act of 1987, introduced by Mr. Ritter, which would strengthen the National Bureau of Standards (NBS) and expand its historical mission; H.R. 1964, the Metric Usage Act of 1987, introduced by Mr. Brown of California, which would require the use of the metric system in federal programs and procurements; H.R. 2164, the Department of Science and Technology Act of 1987, and H.R. 2165, the National Policy and Technology Foundation Act of 1987, introduced by Mr. Brown of California, which would create alternative focal points within the Federal Government for civilian efforts in support of technology development; H.R. 2191, the National Advisory Committee on Semiconductor Research and Development Act of 1987, introduced by Mr. Valentine, to address the competitiveness problems and research needs of the semiconductor industry; H.R. 2069, the Superconductivity Competition Act of 1987,

introduced by Mr. Ritter, which would require the President to appoint a National Commission on Superconductivity to review major policy issues related to recent advances in superconductor research; H.R. 2492, the Federal Industrial Extension Act of 1987, introduced by Mr. Boehlert and Mr. MacKay, that would provide federal aid and technical support to help states start or improve technical extension programs; and H.R. 2219, the Competitiveness Enhancement Act of 1987, introduced by Miss Schneider and Mr. Walgren, which would establish a Clearinghouse for State and Local Initiatives to collect and disseminate information on federal, state, and local technology initiatives.

Witnesses included the President's Science Advisor, Members of Congress, Representatives from government agencies, and experts from major corporations, small businesses, universities, and professional societies. Committee Publication Number 100-22.

3.5(e)—Hearing on Research and Competitiveness in the Construction Industry

Background

The health of the building industry is of vital importance of the nation's economy. In 1986 alone, the United States construction industry had sales of \$375 billion at home and abroad. The economic well-being of the construction industry impacts positively on the American economy and when that industry declines, it adversely affects a wide variety of workers, including boilermakers, carpenters, electricians, masons, and painters, as well as producers of construction materials, mechanical equipment, white goods, and other building contents.

Recently released statistics point to a two-decade downward trend in the productivity of the United States construction industry. Construction's share of the Gross National Product has fallen, the volume of United States construction business abroad has sharply declined, and the number of foreign companies acquiring United States construction firms or contracts has declined. The United States construction industry invests far less in research and development as a percentage of sales than most other United States industries. For these reasons, the Science, Research and Technology Subcommittee held a hearing on Research and Competitiveness in the United States Construction Industry on June 4, 1987.

Summary of hearing

Witnesses represented a variety of organizations, including the National Bureau of Standards, academic centers for buildings and construction research, residential and commercial construction firms, and architectural groups. They testified that productivity in construction is decreasing nationwide, that the lack of research and development in the construction industry is alarming, and that the United States needs to reestablish its technological preeminence in order to regain its worldwide competitiveness. They also testified on the importance of improved technology transfer in the construction industry, to be able to translate the results of research and development into the marketplace at a much faster pace that

exists today. They strongly urged the Federal government to lend support and assistance to improving the health of the construction industry. Committee Publication Number 100-21.

3.5(f)—Field Hearing on "Scientific and Technical Literacy in the Workforce" (Raleigh, North Carolina)

Background

Since the Colonial era, the need for basic proficiency in mathematics, reading, and writing has been recognized by educators as a central goal of instructional programs. With the creation of a public education system during the 19th century, the goal was to provide the opportunity to develop these skills for all citizens. These basic skills were to be developed in the primary grades and were to serve as the foundation for both the vocational and academic tracks established as part of the public school system. A major reexamination of basic skills and their relation to occupational preparation occurred in the 1950's after Sputnik, when increased concern over national defense and a national commitment to manned space exploration led to the enactment of the National Defense Education Act. This legislation encouraged secondary and post-secondary institutions to place additional emphasis on the development of strong science and math skills, as well as to increase the supply of scientists and technical personnel. During this period, recognition of the increasing importance of the sciences for vocational and occupational preparation and for the understanding of key national issues led to a redefining of "basic skills" to include a foundation in the sciences. In the early 1970's, however, employers began to voice concerns about the "basic skills" deficiencies in entry-level personnel. This trend continued through the 1970's and into the 1980's.

In the past several years, a number of studies were released which reflected growing national awareness of the relevance of education, training, and retraining to international economic competition. Concern was expressed over the state of elementary, secondary, and post-secondary institutions, as well as the future U.S. economy. The studies included: "A Nation at Risk: The Imperative for Educational Reform" (The Educational Commission of the United States, 1983); "America's Competitive Challenge: The Need for a National Response" (The Business-Higher Educational Forum, 1983); and "Technology and Employment" (National Academy of Sciences, 1987). These reports point to the low student participation rate in science and math beyond the 10th grade, high levels of functional illiteracy within the general population, and the implications these conditions could have on continued U.S. economic growth and participation in the world economy.

The major question for the future U.S. economy is whether the average American worker will be prepared to adapt to the changes in the workplace brought about by new technology. This is an important question because most of the emerging skilled jobs will have to be filled by today's workers. People already in the workforce will make up over 90 percent of the workers in 1990 and over 75 percent in the year 2000. Yet more than 10 million American

workers are functionally illiterate, barely able to read a job notice, fill out a job application or even make change.

Summary of the Hearing

The field hearing, held November 9, 1987, in Raleigh, North Carolina, examined issues relating to scientific and technical literacy, and their impact on the National economy, using North Carolina as an example at the state level. Witnesses representing various sectors of the state economy, as well as experts familiar with national employment trends described the technical and verbal skills of the workforce including efforts to address workers' proficiency in these areas. The hearing focused on issues relating to the technical skills of those individuals entering the workforce compared with the skills currently required in the workplace. Further efforts to train and retain workers by various sectors of the economy, including volunteer groups, labor unions, educators and private industry, were examined.

The witnesses included: Mr. Richard Daugherty, General Manager of IBM; Former Governor Bob Scott, President of the North Carolina Community College System; Mr. Theodore Drain, Assistant Superintendent of the North Carolina State Department of Public Instruction; Dr. Bruce Howell, President of Wake Technical College; Mr. William Grigg, Duke Power Company; Dr. John Kasarda, Professor of Sociology at the University of North Carolina-Chapel Hill; Dr. Kenneth Spenner, National Academy of Sciences; Mr. William Friday, Chairman of the North Carolina Governor's Commission on Literacy; Mr. Brad Thompson, Raleigh-Wake Citizens Association; Dr. Arlene Fingeret, Professor of Education at North Carolina State University; Mr. Charles Ropeson, Literacy student; Mrs. Anne Tindall, Director of the North Carolina Literacy Association; Ms. Jane Williams, Director of the North Carolina Library; Mr. Tom Reidout, Senior Vice President of First Union National Bank; Mr. Dan Lacy, Vice President of the Business Council for Effective Literacy; and Mr. Joel New, Director of the Employment and Training Division of the North Carolina Department of Natural Resources and Community Development. Committee Publication Number 100-

3.5(g)—Whittier Narrows. California Earthquake: Lessons Learned

On November 10, 1987, the Subcommittee on Science, Research and Technology held a hearing on the "Whittier Narrows, California Earthquake: Lessons Learned." The hearing was held at the request of Congressman George E. Brown, Jr. (D-CA).

Background

On October 1, 1987, an earthquake measuring 6.1 on the Richter scale, struck the Los Angeles area near Whittier, California. Preliminary analysis of the earthquake shows the destruction (seven deaths, hundreds of injuries, over \$200 million worth of damage, and several thousand individuals left homeless) would have been greater if hazard mitigation efforts had not been in place in southern California. In fact, some earthquake experts note that those preparations, changes in building codes and emergency prepared-

ness procedures, saved 10,000 lives. The earthquake and aftershocks that continued to rock the Los Angeles area, have highlighted the value of almost 60 years of preparation.

Although the Los Angeles area is among the Nation's best prepared regions to cope with a damaging earthquake, those preparations are not yet adequate to address future major earthquakes which are expected to occur in California. Thousands of buildings still need to be retrofitted and preparedness and response activities need constant refinement. Furthermore, insurance coverage is lacking. Only about \$30 million worth of property losses located in the Whittier earthquake area were insured. About 40 aftershocks exacerbated psychological stress.

If, as experts predict, an earthquake of Richter magnitude, 8 or greater, strikes southern California sometime within the next 30 years, thousands of deaths, tens of thousands of injuries, property losses of \$70 billion, and thousands of homeless individuals could result.

Focus of Hearing

Many witnesses noted that because the power of the Whittier earthquake was slight, relatively speaking, coping with it amounted to a dress rehearsal for the larger earthquakes which are predicted. The earthquake emphasized that there are some very serious issues that have not been adequately addressed. For instance there is a need to: increase efforts to make structures in the region as earthquake-resistant as possible; improve emergency preparedness, response and recovery measures; increase earthquake insurance; and improve earthquake prediction. The witnesses agreed that the earthquake of October 1, serves to remind the Nation that it must continue to prepare vigorously for the inevitable catastrophic earthquake, as well as smaller events, such as the Whittier Narrows earthquake, which cause significant losses and costs to American society.

Witnesses who participated in the hearing included: Congressman David Drier (R-CA); federal witnesses from the Federal Emergency Management Agency, U.S. Geological Survey, National Science Foundation, and National Bureau of Standards; Mr. Paul J. Flores, Director, Southern California Earthquake Preparedness Project; Dr. Kathleen J. Tierney, Adjunct Assistant Professor, Institute of Safety and Systems Management, University of Southern California; Mr. John Kariotis, President, Kariotis and Associates; Mr. John Drennan, Assistant Vice President and Actuary, Allstate Insurance Company; and Mr. Richard J. Rother, Jr., Assistant Insurance Commissioner and Chief Property/Casualty Actuary, California Department of Insurance. Committee Publication Number 100-63.

3.5(h)—Field Hearing on Federal Science and Technology Support for Historically Black Colleges and Universities

On October 9, 1987, the Subcommittee on Science, Research and Technology held a hearing on Federal Science and Technology Support for Historically Black Colleges and Universities (HBCUs) on the campus of North Carolina Central University, Durham, North

Carolina. The hearing was held at the request of Congressman Tim Valentine (D-NC).

Background

At a time of growing concern about the under-representation of Blacks in science and engineering, the Historically Black Colleges and Universities (HBCUs), which have traditionally educated a major portion of the nation's Blacks, are beset with increasing problems. HBCUs serve some of the country's most disadvantaged students, but have slim endowments, and lack financial resources to develop programs to compete with other schools in science and technology. Also, the opening of traditionally White institutions to Black students has increased the competition for students, faculty and money.

In 1981, the HBCUs produced more Black baccalaureates in engineering, computer sciences and mathematics, and the biological and physical sciences than the total produced by the other 673 institutions in the 19 southern states in which HBCUs are located. Yet, Blacks continue to be underrepresented in science and engineering. A 1986 NSF study, "Women and Minorities in Science and Engineering," found that Blacks account for only 2.3 percent of all employed scientists and engineers, although Blacks constitute 10 percent of the overall U.S. workforce.

These numbers reflect the small percentage of Black college students who major in science and technology. Black student enrollment in science and engineering is approximately one percent of the enrollment in those fields, while Blacks account for about eight percent of total college enrollments.

To reverse this situation, HBCUs need to develop new science and engineering programs, creative approaches to student recruitment, as well as pre-college programs for gifted Black students. North Carolina Agricultural and Technical University (NC A&T), in Greensboro, is moving increasingly into the field of scientific research. Five years ago, NASA awarded the University a \$10,000 grant to develop payloads for the Space Shuttle. Today, in addition to its state subsidy, NC A&T receives about \$9 million annually in federal grants for scientific research.

Another HBCU, Xavier College in New Orleans, has developed a special niche for itself with a program to bring Black high school youngsters interested in the sciences to campus for a summer program. The program, SOAR (Stress on Analytical Reasoning), has helped identify and recruit bright students for Xavier.

Historically, HBCUs have operated on small budgets, limited by their students' ability to pay tuition and, for public HBCUs, by small state appropriations. They are heavily dependent on federal aid—both student aid and institutional aid. Consequently, the future of these institutions and their new programs is integrally tied to federal policy decisions.

On September 15, 1981, President Reagan issued Executive Order 12320 to strengthen the nation's HBCUs. This order directs federal agencies to increase significantly the participation of HBCUs in federally-sponsored programs by eliminating barriers which may have unfairly resulted in their reduced participation in such programs. A key provision of the Executive Order calls for the stimu-

lation of initiatives by private sector businesses to strengthen HBCUs. Under the Executive Order, the Secretary of Education is directed to submit to the President an annual federal performance report on Executive agency actions to assist HBCUs. A second annual science and technology symposium sponsored by the U.S. Department of Education and White House Initiative on HBCUs was held on September 23-25, 1987, in Washington, D.C. The symposium, "Alliances: An Expanded View," explored: new arrangements among the private sector, government and HBCUs; HBCUs capabilities in forefront scientific research; and the connection between pre-college students and HBCUs and ways to build stronger pipelines to Black aspiring scientists and engineers.

Several initiatives have been proposed by the National Science Foundation (NSF) to increase minority enrollment in science and engineering. NSF will grant \$5 million to six HBCUs this year for the purpose of establishing Minority Research Centers of Excellence.

Focus of Hearing

The central thrust of the hearing was on the role of the Federal Government in: correcting the problem of minority under-representation in the science and engineering fields; helping HBCUs and major research institutions increase minority participation in science and technology; and enhancing the quality of science and engineering education in HBCUs.

Additional issues explored by witnesses included: How effective the President's Executive Order of 1981 has been in increasing the participation of HBCUs in federally-sponsored research programs; what role the Federal Government should play in providing development funds for HBCUs seeking to establish alliances, collaborations, and associated research and teaching programs; what effective mechanisms could be established to enhance collaboration between minority researchers and programs at major research universities or federal laboratories for training and retaining Black faculty at HBCUs; and how cooperative efforts can be increased between HBCUs, the private sector and other institutions.

Although invited, a representative from the President's Initiative on HBCUs did not participate in the hearing. Representatives from the National Science Foundation; the Higher Education Office of the Governor of North Carolina; North Carolina institutions: North Carolina A&T, University of North Carolina, Chape Hill, St. Augustine College, and Duke University; Tuskegee University; the Association of Minority Health Professions Schools; AT&T Bell Laboratories; Merck and Company; and Eastman Kodak Company participated in the hearing. Committee Publication Number 100-62.

3.5(i)—The Fastener Quality Assurance Act of 1988 (H.R. 5051) and the Standardization of Measurement Act of 1988 (H.R. 5120)

H.R. 5051—To require that certain fasteners sold in commerce conform to the specifications to which they are represented to be manufactured and to provide for the approval of accreditation systems for laboratories testing fasteners sold in commerce.

H.R. 5120—To provide for a system of standardization of measurements of bolts to increase bolt quality and reduce the danger of substandard bolt failure, and for other purposes.

Summary and Background of Legislation

The purpose H.R. 5120, of the Standardization of Measurement Act of 1988 is to eliminate the danger posed by the use of defective bolts by standardizing the system of measurement of bolts and thereby improve bolt quality. The purpose of H.R. 5051, the Fastener Quality Assurance Act of 1988 is to establish a system for guaranteeing the performance of fasteners manufactured in the United States through laboratory accreditation.

The United States uses billions of bolts and other fasteners in buildings, nuclear plants, bridges, motor vehicles, airplanes, and other equipment each year. One type of fastener, grade 8.0 bolts, is used by the Department of Defense in over 500 weapon systems, by NASA in numerous ways, and by industry in a wide variety of applications requiring high strength bolts. In recent years, counterfeit and substandard bolts and other metal fasteners, produced both in the United States and abroad, have entered the economy creating an enormous national safety problem. As a result, both the military and civilian sectors of the economy have experienced dangerous equipment and construction failures, as well as extraordinary expenses.

Legislative History/Summary of Hearing

H.R. 5051 was introduced by Congressman John Dingell on July 14, 1988 and jointly referred to the Committee on Science, Space, and Technology and the Committee on Energy and Commerce. H.R. 5120 was introduced by Congressman Robert A. Roe on August 1, 1988 and referred to the Committee on Science, Space, and Technology. Both bills were subsequently referred to the Subcommittee on Science, Research and Technology.

The Subcommittee on Science, Research and Technology held a hearing on H.R. 5051 and H.R. 5120 on August 9, 1988. Witnesses testified on the need for a laboratory accreditation system to oversee the process used for fastener testing, and testified on the relationship that currently exists between the National Institute of Standards and Technology (NIST) and the voluntary consensus standardization organizations which develop fastener standards.

Witnesses at the hearing included Mr. Ray Kammer and Dr. Lyle Schwartz, NIST; Mr. Charles Wilson, Industrial Fasteners Institute; Mr. Joe O'Grady, American Society for Testing and Materials; Mr. James Nicolo, Defense Industrial Supply Center; and Mr. Richard Hautala, Society of Automotive Engineers. The government witnesses testified that no legislation was necessary, that the problem could be handled through contract enforcement. The non-government witnesses testified that they preferred the approach in H.R. 5051. Committee Publication Number 100-127.

3.5(j)—Other Standardization Legislation and "The Standardization of Weights and Measures"

The Committee on Science, Space, and Technology requested sequential referral of several bills under Rule X(1)(r)(2) dealing with "the Bureau of Standards, the standardization of weights and measures, and the metric system". The specific pieces of legislation were H.R. 2837, the Indoor Radon Abatement Act of 1988; H.R. 4065, the Federal Energy Management Improvement Act; H.R. 2693, the Asbestos Information Act of 1987; H.R. 4325, the Medical Testing Improvement Act of 1988; and H.R. 5051, the Fastener Quality Assurance Act of 1988. Each of these bills were within the Committee on Science, Space, and Technology's responsibilities for standards, measures, or lab certification. The Committee's efforts were assisted by the Subcommittee on Science, Research and Technology.

The Committee interprets "standardization of weights and measures" as the *process* of establishing standards, weights, and measures. Regarding "measures", the Committee's jurisdiction encompasses research and development associated with the science of measurement, which includes the development of equipment for measurement, and the process by which measurement is conducted. Perfecting measurement tools and processes is just the first step in developing a system of science and engineering or technology dependent upon measurement accuracy and precision. Standardization of measurement is the key to technical validity. Without the ability to duplicate research results through measurement, it would be impossible to validate research results or to apply them.

Standardization requires traceability to a single accurate source, a role the Federal Government assumed with the creation of the National Bureau of Standards (now the National Institute of Standards and Technology—NIST) in 1901. A typical NIST task in standardization of the measurement process is its assessment of watt-hour meters which are used to calculate the electricity bills of utility customers nationwide. The NIST assures measurement accuracy within acceptable limits of a meter supplied by a utility, which then is used as a master to calibrate the thousands of meters monitoring customers' homes. This process provides traceability of all power consumption measurement to NIST and assures that a watt-hour used in California is measured as accurately as a watt-hour used in New York.

The NIST is the lead federal agency involved in the research, development and dissemination of measurement tools and processes and of standard reference materials. Currently, the NIST has numerous measurement programs assisting almost every area of commerce, as well as emerging programs for such new or rapidly changing fields as bioprocess engineering, biochemistry (i.e. protein characterization), advanced materials, fiber optics, electronics, and automated manufacturing. Only half of the NIST's funding for this activity comes from direct appropriations. The remaining is contract work supporting other agencies' measurement requirements in almost every technical field. The Committee is interested in assuring that the NIST is adequately funded to perform its responsi-

bility and that the relevant agencies are able to transfer measurement research results to the public and private sectors.

With regard to the term "standards", there is frequently confusion over exactly what this word implies. Standards are developed by the NIST, other federal agencies, voluntary consensus organizations, and international organizations. The Committee has proposed the following general rule to the parliamentarian: if legislation involves new methods of measurement or the development of standards with scientific basis, it is then within the jurisdiction of the Committee on Science, Space, and Technology.

Voluntary consensus standards organizations, such as the American Society for Testing and Materials, or the American Society of Mechanical Engineers, support a peer review system which establishes a wide variety of standards without the involvement of the Federal Government.

Any Federal Government research programs to assist the development of new technical standards are clearly within the Committee's jurisdiction. Most research is performed by the NIST and is directly related to the NIST's role in standardization. For example, NIST is continually improving the accuracy of existing measurement devices and standards such as temperature sensors. The NIST also spends a great amount of effort developing methods called protocols to permit equipment by one manufacturer to be used with equipment from another. In 1903, the problem was making all fire hoses fit all fire hydrants. Today these standardization problems are much more complex, such as developing the many levels of computer language required to make different manufacturers' robots talk to each other in an automated factory or to allow different brands of computers to exchange data or work together.

Such standardization programs are of legislative interest to the Committee to the extent that new knowledge or protocols are required to make a standardization program a success. Eventually, the government's research translates into standards issued by the voluntary consensus standards organizations. This research has been given much higher visibility in the current budgetary climate, since the need for new standards greatly exceeds the resources available to develop them. In addition, any legislation which impacts the programs at the NIST should be considered by the Committee because the addition of new authority at the NIST is actually a rearrangement of priorities; new programs, when resources are limited, invariably replace ongoing ones and it is the Committee's responsibility to set these priorities.

The Committee on Science, Space, and Technology is interested in assuring that the proper role of various federal agencies is considered in the process of developing new standards and measures, given the importance of the many emerging technologies and new understanding of our biosphere, it would appear that legislation is being introduced more frequently involving new standards, measurement, or measurement methods related to new technologies and phenomena which require both federal and non-federal involvement for development and promulgation.

3.5(k)—Hearing on Women, Minorities and the Disabled in Science and Technology

Background

The disproportionately small number of women, minorities, and disabled individuals in science and technology has long been a concern of the Subcommittee on Science, Research and Technology. In 1986, Congress called for the establishment of an interagency Task Force on Women, Minorities, and the Handicapped in Science and Technology in Section 8 of the National Science Foundation Authorization for Fiscal Year 1987 (P.L. 99-383) to examine the current status of Federal Government employment of these groups; coordinate existing efforts to increase participation of these groups in science and engineering; and to develop additional measures.

The scheduled release of the Task Force's "draft" interim report, *Changing America: The New Face of Science and Engineering* prompted the SRT Subcommittee to hold a hearing on June 28, 1988 to review the findings of the report. Two related reports, the Office of Technology Assessment's *Educating Scientists and Engineers: Grade School to Grad School*, and the American Council on Education's *One-Third of a Nation*, were also reviewed and discussed.

Summary of the Hearing

Witnesses at the hearing on June 28, 1988, included the authors of the reports and representatives of successful programs for women, minorities, and the disabled. All three groups noted the significant and increasing under-representation of women and minorities in scientific and engineering fields at a time when those groups account for a growing percentage of the population, including increasing federal support for pre-college education, federal scholarships and fellowships to attract top students to careers in science, engineering, and teaching, and targeting federal research grants and hiring to attract women, minorities and the disabled to science and engineering. Committee Publication Number 100-134.

3.5(l)—Hearing on the Privatization of the National Technical Information Service (NTIS)

Background

During the 1980s, several A-76 reviews of the National Technical Information Service were conducted to determine whether part or all of the NTIS could be operated more economically in the private sector. Each of the reviews resulted in the conclusion that NTIS should continue as part of the government. A 1986 Department of Commerce analysis concluded that only minor adjustments to the operation of NTIS were warranted and recommended against substantial privatization on the grounds that it would not be cost effective and could jeopardize important government functions. In 1987 OMB decided to pursue a substitute contracting out procedure for NTIS known as the Federal Employee Direct Corporate Ownership Opportunity Plan (FED CO-OP) in lieu of the A-76 process, a formal Executive branch contracting procedure. A Request for Information was published in the Federal Register in December 1987;

a Bidders' Conference was held in January 1988 to further the Administration's announced intent to use a FED CO-OP plan to privatize NTIS; and a final Request for Proposals was scheduled to be issued by the end of February.

The plan had raised substantial concern in the Congress. Language banning the further contracting out of NTIS and a requirement that the Department of Commerce submit plans to the Congress for modernizing NTIS was included in H.R. 3, the Omnibus Trade and Competitiveness Act of 1988 and subsequently in H.R. 4848 which became P.L. 100-418.

Summary of Hearing

The hearing held February 24, 1988, focused on the legality and the appropriateness of the proposed FED CO-OP for NTIS. Witnesses included representatives from the Office of Technology Assessment; Public Citizens/Congress Watch; Special Library Association; National Federation of Federal Employees; and the National Academy of Public Administration. All opposed privatization. The testimony of Dr. Seidman, the National Academy of Public Administration witness, centered around the transformation of NTIS as a government corporation. The invited representatives from the Department of Commerce declined to testify on that date, and appeared instead at the National Bureau of Standards FY 1989 Authorization hearing held on March 15, 1988. Committee Publication Number 100-84.

3.5(m)—Hearing on Oversight of the Office of Science and Technology Policy

Background

The Office of Science and Technology Policy (OSTP) was created by the National Science and Technology Policy, Organization, and Priorities Act of 1976, P.L. 94-282. The Director of OSTP, who is appointed by the President and confirmed by the Senate, is charged with providing "within the Executive Office of the President, advice on the scientific, engineering, and technological aspects of issues that require attention at the highest levels of Government". Among other responsibilities, the Director is charged with assisting the Office of Management and Budget (OMB) in the annual review and analysis of funding proposed for research and development in budgets of all Federal agencies and is charged with providing general leadership and coordination of the research and development programs of the Federal Government.

Since the establishment of OSTP, the budget for the Office has fluctuated tremendously, and personnel and other resources available to the Director have been limited. In the last four years, the Administration has been slow to reappoint a permanent Director; the position was in "acting" status for most of 1986. Further, during the 70's and 80's OSTP has been perceived as expending most of its resources on short-range analyses and assessments of mission-related research and development activities, rather than longer-range strategic planning and analyses for science and technology as mandated by the statute.

Although annual posture hearings have been held on the federal research and development budget with the OSTP Director as principal witness, no over-sight hearing on the mission and function of OSTP has previously been undertaken by the House. Therefore, a hearing was held on February 17, 1988 to explore the impact of OSTP activities on the health of American science and technology and to determine the extent to which OSTP has or has not been fulfilling the intent of national science and technology policy expressed in P.L. 94-282.

Summary of Hearing

Views were sought from former government officials, from academe, and from industry on the impact and effectiveness of OSTP and on possible ways and means for improving the functioning of the Office. Witnesses included the current OSTP Director and a panel of former directors; a panel of former heads of federal R&D agencies; and a panel of university and industry officials who have been closely involved with the issues surrounding science advice to the President.

Broad agreement emerged from the discussions that the resources available to OSTP were not commensurate with the range of responsibilities of the office. The witnesses were nearly unanimous in calling for higher staffing levels but with a smaller proportion of the staff composed of rotators from other agencies. The point was also made that the statute establishing OSTP is somewhat unrealistic in placing too much responsibility on OSTP for detailed coordination among R&D agencies, for detailed formulation of the federal R&D budget and for various recurring reports and studies. It was suggested that OSTP, in addition to the inevitable role of responding to the day-to-day issues that arise in the White House, should focus attention on indentifying and championing federal support for high payoff technologies.

The witnesses expressed considerable skepticism about alterations to the science advisory structure leading to a more effective OSTP. The personal relationship between the President and his science advisory and the importance the President places on obtaining advice from the science and technology community were judged to be the critical factors in determining the impact of OSTP. Nevertheless, several witnesses advocated elevating the status of the science advisor to cabinet level or to the level of special assistant to the President in order to enhance the odds of attracting an eminent scientist or engineer to the position. Committee Publication Number 100-106.

3.5(n)—Fire Safety in Multifamily Housing

The Subcommittee on Science, Research and Technology has had a continuing interest in improving fire prevention and control through public education, training of firefighters, effective fire codes, and proper uses of materials, alarms and sprinklers in all buildings. The concern has grown out of the Subcommittee's jurisdiction over the U.S. Fire Administration, the Center for Fire Research and the National Fire Academy, all created in the Federal Fire and Prevention and Control Act of 1974 (P.L. 93-498).

Recently, controversy has erupted over whether codes for multifamily housing have become too lax, increasing the likelihood of fire spreading between units of a building. The Federal Government withdrew from this arena in 1984 when the Department of Housing and Urban Development (HUD) abolished its code for multifamily units built with federal funds, and deferred to local codes.

Local codes may require lower fire rating for walls (the amount of time a fire would have to burn to breach a wall) than the federal code, allow the rating to be achieved with different materials, or allow trade-offs in return for installation of sprinklers or other safety devices.

Much is at stake in this dispute, starting with the lives and property of the occupants. In 1987 alone an estimated 327,000 units were constructed, with a combined value of as much as \$15 billion (of a total \$398 billion in new construction expenditures). Government involvement in multifamily housing remains considerable despite a drop in direct housing subsidies. Federal involvement takes the form of tax benefits and financial incentives available to developers and owners of multifamily housing.

While fires in one- and two-family occupancies account for the greatest portion of the nation's fire losses, fires in multifamily housing (buildings containing more than two units) cause considerable death and destruction. In 1986, 665 people died and property valued at \$472 million was lost in such blazes.

In addition, various sectors of the construction industry have a major financial stake in the requirements in code. Fire ratings affect decisions on whether to use concrete products or gypsum board for walls, touching off a major rivalry.

Focus of the Hearing

The hearing held on July 28, 1988, examined the following questions: How do we balance the risk reduction and cost when determining a reasonable level of safety for multifamily housing, especially those for which government has direct responsibility because they are built with federal funds? What materials adequately contain fires? Do our fire codes accurately reflect our knowledge of fire containment? Are we sacrificing fire safety for financial savings?

Among the points raised at the hearing were:

More money is needed for federal fire research. Funding is far below what was envisioned in the 1972 report "America Burning". Yet researchers are still developing the quantitative tools needed to objectively evaluate fire codes.

More emphasis should be placed on fire safety education, since most fires are caused by human action.

More information is needed on how different materials—concrete and gypsum, particularly—behave in fire.

Fire codes should require "redundancy" since any single fire safety measure may fail to function in a fire.

The witnesses included representatives from the U.S. Fire Administration Center for Fire Research, Department of Housing and Urban Development, National Concrete Masonry Association and Gypsum Association. Committee Publication Number 100-111.

3.5(o)—Technologies for Remediating Global Warming

Background

Accumulating scientific evidence points to a warming of the earth's climate due to the increase of "greenhouse" gases in the atmosphere. The magnitude of the greenhouse effect is related to changes in concentration of the greenhouse gases, which in turn is influenced by human activities. For example, carbon dioxide, the most important gas, is released in the combustion of fossil fuels, and the quantity of fossil fuels consumed has accelerated with the increased industrialization of the nations of the world. It is estimated that two thirds of the man-made carbon dioxide added to the atmosphere since the beginning of the industrial revolution has been added in the past 35 years.

A consensus is forming among scientists which predicts that global warming due to increased concentration of greenhouse gases will cause significant climate changes. The magnitude of the climate change, and perhaps more importantly the rate of climate change, is expected to result in large dislocations in agriculture, forestry, water resources, and other environmental resources. Also, rising sea levels resulting from the melting of polar icecaps would affect the large populations living in coastal regions of the world.

Since human activities will control the severity of the effects of global warming, it is imperative to begin to consider options for controlling the emission of greenhouse gases into the atmosphere and for adapting to greenhouse warming, which will necessarily occur due to past actions. Gaps exist in scientific knowledge regarding the greenhouse processes affecting climate, which results in uncertainties in predicting when and in which specific locations events of particular severity will occur. Nevertheless, the evidence at hand is sufficient to lend urgency to consideration of remedial actions for global greenhouse warming.

Summary of Hearing

A joint hearing of the Subcommittees on Science, Research and Technology and on Natural Resources, Agriculture Research and Environment was held on June 29, 1988, to assess possible greenhouse warming remediation technologies. Although intended to provide an update on the scientific evidence for the greenhouse effect, including identification of gaps in current knowledge, the main focus of the hearing was on options for remediation of greenhouse warming. Both policy changes and new technologies was considered.

Witnesses included representatives from federal atmospheric sciences and energy laboratories, private environmental organizations, universities, and industry. The witnesses addressed a range of topics, including reduction of energy use through efficiency and conservation improvements, strategies for replacement of fossil fuels with hydrogen and with nuclear power, and recovery of atmospheric carbon through reforestation.

The important role of energy conservation in remediating global warming was stressed by several witnesses. It was pointed out that the U.S. does not compare well with other advanced industrial nations in terms of energy efficiency. Japan is twice as energy effi-

cient, for example. Reducing use of fossil fuels would not only cut greenhouse gas emissions but would also improve our foreign trade deficit and help ease the capital-intensive conversion to alternative energy sources, such as hydrogen.

One witness raised the problem of unintended consequences regarding federal policies to encourage development of synthetic fuels, which may unintentionally increase greenhouse emissions. The example cited was methanol produced from coal as a replacement for gasoline. The process of producing methanol results in the release of more carbon dioxide than from combustion of an equivalent amount of gasoline. The witness suggested the need for better coordination of federal energy and environmental policies. Committee Publication Number 100-137.

3.5(p)—New Directions in Home Video

Background

High Definition Television (HDTV) is a developing technology that provides dramatically improved resolution, clarity, and color purity in a television image. The HDTV picture is equal to, if not better, than the quality of 35 millimeter slides. Since there are more than 140 million TV sets currently in use in the United States, the potential market for HDTV is enormous. It has been estimated that by the 1990's the HDTV market will reach \$30 billion annually.

The ultimate stakes could be even higher. HDTV will generate research and technology in special types of semiconductors, signal compressors, and fiber optics, and could profoundly affect all industries that rely on video displays. Control of the HDTV market and its technologies is critical for the economic and technological leadership in the worldwide electronics market.

The hearing pointed out that, as a nation, we have not done well recently in bringing new U.S. technologies to the marketplace. In fact, only one U.S.-owned television manufacturer, Zenith, remains, and it is expected to be acquired by a foreign company. The American Electronics Association is encouraging industry to respond to this need for U.S. technological leadership. This country lacks a method to launch a unified effort in HDTV. This is not the case in Japan and in Europe. Japan, through its Ministry of International Trade and Industry, has spent an estimated \$500 million on HDTV, and reports indicate that they will start direct satellite broadcast transmission in 1990. The Europeans, through their Eureka consortium, have already spent more than \$200 million on their HDTV system, and also plan to introduce it in 1990. If American companies are going to become major participants in HDTV, the time is at hand for some concerted action on the part of domestic electronic industries. The purpose of the hearing was to determine, what, if any, is the role of the Federal Government in that action including the possibility of encouraging more U.S. companies to enter this market.

Summary of Hearing

The Subcommittee held a hearing on June 23, 1988 entitled, "New Directions in Home Video." Witnesses included the Honora-

ble Mel Levine (D-CA), representatives of the computer and electronic industries, academia, members of electronic industry associations, and advanced television systems committees.

The witnesses reviewed the current status of the American electronics industry vis-a-vis the prospects for domestic control of the HDTV market. For the most part, the testimony provided evidence that unless American industry acts soon, and in a concerted manner, we will lose control of the HDTV market and all its ancillary industries to foreign competition. Witnesses also lamented the demise of the American TV manufacturing industry and offered suggestions on what would be required for American firms to reenter that field. Witnesses also offered possible solutions to the problem of how to ensure American control of the HDTV market, including a proposed 18 month HDTV Task Force, composed of representatives from private industry, academia, and the government. The role of this Task Force would be to chart the course for American entry and participation in the HDTV market. Some witnesses suggested a government-funded consortium, but acknowledged it would be difficult to find industrial partners. Committee Publication Number 100-102.

3.5(q)—Steel Research and Markets of the Future

Background

The steel industry continues to be a vitally important industry both for U.S. military preparedness and for a healthy manufacturing base. High quality, reasonably priced U.S. steel products remain as important an ingredient to U.S. manufacturing as energy or skilled labor. However, the steel industry's health is equally dependent on the health of other basic industries. When demand for domestically produced automobiles, farm implements, or pipelines goes down, the steel industry must contract.

In the early 1980's, the steel industry declined. Its domestic market decreased, losing production orders to steel imports from foreign companies. Also, steel faced greater competition from new materials and composites. Simultaneously, the industry cut back its research and development in response to the \$12 billion losses experienced by the industry. Steel research efforts are a small fraction of what they were a decade or two ago and domestic companies have been importing modern processing technology from overseas.

In spite of these difficulties, the domestic industry took steps necessary to improve the quality of its products and to modernize its capital stock. A weaker dollar, import restraints and an abundance of orders have helped the industry begin to recover.

On August 4, 1988, the Science, Research and Technology Subcommittee held a hearing to examine several aspects of the steel industry: the current demand for steel; the changing nature of steel products; how private and federal research and development relate to demand and changing products; and the federal research posture toward the steel industry's long-term future.

Summary of Hearing

Witnesses included chief executives of steel producing companies, economists who specialize in forecasting steel market trends, consumers of steel, academicians involved in steel research and development, and representatives of steel producers' associations. Their testimony affirmed the need for continued steel research and development, in light of the advances made by foreign competitors in steel producing methods. The steel companies' officers urged that this research and development be near-term, low risk in its nature, and while they welcomed government assistance, they insisted that it be the industry and not the government which determined the type of research. Economists testified that the current surge in demand for steel products will soon diminish, and they predicted that the industry would, in the next few years, face a decline in the domestic demand for steel products. Testimony was also given regarding the need to maintain the voluntary restraint agreements on the importing of steel and the need to strike a balance between the needs of the steel producers and the requirements for a clean and healthy environment. Committee Publication Number 100-113.

3.5(r)—Hearing on United States-Japan Cooperative Agreement in Science and Technology

Background

On June 20, 1988, the United States and Japan signed an agreement to renew cooperation in research and development in science and technology. Although the 1980 comprehensive science and technology agreement with Japan raised expectations for cooperative research opportunities, United States officials felt it did little to counter-balance inequities in the U.S./Japan science and technology relationship.

Underlying this perceived imbalance in technology flow was the issue of reciprocity: the assumption that U.S. scientists do not have access to Japan's best research facilities, as Japan has here. Since 1985, when the agreement was renewed for two years, U.S. officials have sought a higher level of access to high-quality Japanese science and technology research. The new agreement substantially expands cooperation into several broad new areas, including superconductivity; sets up three committees to implement the agreement; and lays down rules for handling intellectual property rights for potentially sensitive military information that might arise from joint research. The agreement also contains a commitment on the part of Japan to open research and development to American scientists.

Summary of Hearing

On July 13, 1988, the Science, Research and Technology Subcommittee and the International Scientific Cooperation Subcommittee held a joint hearing to review the provisions of the recently signed U.S./Japan Science Agreement. The purpose of the hearing was to determine whether U.S. objectives in signing the Agreement were being met. Witnesses included Dr. Frederick Bernthal, Assistant Secretary of State for the Bureau of Oceans and International En-

vironmental and Scientific Affairs. He was accompanied by Peter De Vos, Deputy Assistant Secretary for Science and Technology Affairs. Representatives from the Office of Science and Technology Policy, the Department of Commerce, and the National Science Foundation were also invited to provide technical support and advice. Committee Publication Number 100—.

3.5(s)—Field Hearing on University/Industry Alliances (St. Louis, Missouri)

Background

Federal and state governments have encouraged cooperation between industry and universities in recent years. These connections are viewed as a way to improve the ability of American firms to compete in the international market and, by state and local governments, as a way to create an entrepreneurial climate for attracting high technology companies to the proximity of research universities. Universities are a major source of the new knowledge which may lead to important commercial products and services. Universities are also the source of scientific and technical talent, and the availability of skilled labor is the most influential factor in the regional location of advanced technology firms, according to a study by the Joint Economics Committee of Congress ("Location of High Technology Firms and Regional Development," Robert Premus, June 82).

Many industries have historically supported research in universities to help supply their basic research needs and to help identify and recruit new talent. The linkage between industry and universities waned in the years following World War II when federal support for university research became dominant, but industrial support has become more important in recent years as federal funding has leveled off. According to the National Science Foundation (NSF), industrial expenditures in universities grew from \$235 million in 1980 to \$670 million in 1987. NSF estimates that industrial support will grow from the current 8 percent to 10-12 percent of university research budgets by the early 1990's.

Cooperation between industry and universities has taken a number of forms, including industrial sponsorship of research by individual professors or by university research centers, exchanges of researchers, university assistance to high tech and old-line manufacturing firms, and the establishment of industrial parks to help new businesses. Along with the anticipated benefits of these interactions in creating more innovative commercial products is the concern that corporate sponsorship of research could distort the university's mission and endanger free inquiry and open dissemination of basic research results by scientists in academe.

Summary of Hearing

The field hearing held February 8, 1988, explored issues surrounding university/industry interactions by focusing on specific examples of such linkages in Missouri. The witnesses addressed the role of the state government in fostering university/industry cooperation, the factors both spurring increased interactions and also posing barriers to effective cooperation, criteria for evaluating the

economic impact and effectiveness of university/industry partnerships, the level of participation by small companies in such interactions, and the implications of involvement by foreign companies in university research.

The witnesses included representatives from five universities, three large corporations, one small business, state and local governments, and the Federal Government. In general, the witnesses revealed no serious problems impeding the formation of university/industry alliances. The university representatives reported no problems with undue interference by industrial partners in formulating research objectives and no serious restrictions on open publication of research results.

There were differences in expectations of the industrial partners based on the nature of the industries involved. The biotechnology companies anticipated fairly rapid commercialization of new discoveries while an aerospace company expected the outcome to be only general expansion of the technology base in targeted areas of interest.

Committee Publication Number 100-90.

*3.5(t)—Field Hearing on Economic Development Through
Technology Transfer, Denver, Colorado*

Background

Concerns over trade and the competitiveness of U.S. industry have refocused attention on the potential of the federal laboratory system. There is a growing awareness in the private sector of the resources available in these laboratories and an increased willingness to work with the Federal Government. In recognition of the potential benefits to be derived from expanded utilization of the resources of the Federal Government, Congress passed the Stevenson-Wydler Act (P.L. 96-480) and the Federal Technology Transfer Act of 1986 (P.L. 99-502). These two laws were designed, among other things, to encourage and foster the transfer of technology and technical expertise from the federal laboratories to the private sector where commercialization of products takes place.

P.L. 96-480 was passed in 1980. The Federal Technology Transfer Act was enacted in 1986 to strengthen the earlier legislation and to provide additional incentives to facilitate the transfer of technology from Federal laboratories to the private sector for use in new commercial products and processes. One of the provisions of P.L. 99-502 allows government-owned, government operated laboratories to enter into cooperative research and development agreements with other federal agencies; units of State or local government; and/or private sector, and to provide such entities with title to inventions resulting from this agreement. The law also creates a legislative mandate for the Federal Laboratory Consortium for Technology Transfer and provides incentives for federal employees to expedite the transfer and development of technologies and techniques initially generated within their laboratories.

Focus of the Hearing

Since the enactment of the Federal Technology Transfer Act of 1986, agencies had sufficient time to begin to implement the legis-

lation and a Congressional review of that implementation was warranted. The Federal Laboratory Consortium for Technology Transfer was in the second full year of operation under a new structure. Various mechanisms for encouraging laboratory employees to transfer technology and to reward them for accomplishments had time to take effect.

Thus, the Denver field hearing on February 5, 1988 was organized to explore the impact of technology transfer policy on economic development and to explore actual technology transfer case studies. The lead-off witness was the Honorable Roy Romer, the Governor of Colorado, who explained the extensive steps Colorado has taken during his tenure to spur economic development by encouraging businesses to take advantage of the high quality resources available at local universities and government laboratories. The first panel included the Dean of Engineering of the University of Colorado, the regional coordinator of the Federal Laboratory Consortium for Technology Transfer, and a leading Denver venture capitalist. These witnesses discussed the role of technology transfer from the nearby federal laboratories in state economic development plans and programs; cooperation efforts between the University of Colorado and Colorado federal laboratories; and progress to date of the Federal Laboratory Consortium in implementing new responsibilities under the Federal Technology Transfer Act.

Three additional panels focused on technology transfer programs of Colorado-based operations of the Department of Energy, the Department of Commerce, and the National Oceanic and Atmospheric Administration. Appearing along with the senior officials from these two agencies were the scientists, technology transfer officers, and companies who have been actively involved in the transfer of specific ideas from the laboratory to businesses wishing to commercialize them. They discussed achievements in implementing the Federal Technology Transfer Act and problems that remained.

Certain small changes were added to the 1989 National Institute of Standards and Technology Authorization (P.L. 100-519) to correct some of the problems raised in the hearing. In addition, the Subcommittee, in conjunction with the Senate Commerce Committee, circulated a questionnaire to agencies and major federal laboratories on technology transfer problems to obtain further background and suggestions for enhancing technology transfer. Committee Publication Numbers 100-83 and 100-110.

3.5(u)—Field Hearing on Photonics

Background

Photonics is a new technology in which light or photons, rather than electrons are used to acquire, transmit and process information. Research in photonics holds out the potential of revolutionizing several industrial fields, most notably telecommunications, computing and aerospace. Interest in the field is growing, both in the U.S. and abroad, especially in Japan. The Air Force's comprehensive research study, Project Forecast II, listed photonics as a top priority. Similarly, the Aerospace Industries Association cited photonics in its report "Key Technologies for the 1990's".

Photonics research goes on under a variety of titles in a number of corporations and federal agencies. The Air Force, Army, Defense Advanced Research Projects Agency (DARPA), Department of Energy, National Science Foundation, and National Bureau of Standards (now the National Institute of Standards and Technology) are among the entities active in the field.

The Subcommittee had never examined this research area, which is an ideal topic for the government-university-industry partnerships envisioned in the Technology Transfer Act of 1986.

It viewed Rome, New York as an appropriate location for the hearing (May 2, 1988) because the Air Force's primary photonics lab, Rome Air Development Center, is located there. In addition, leading corporations and universities active in the field are nearby.

Focus of the Hearing

The four federal agencies represented at the hearing—the Air Force, the Defense Advanced Research Projects Agency (DARPA), the National Science Foundation (NSF) and the National Bureau of Standards (NBS)—currently spend about \$80 million on photonics research and expect that total to continue to increase. The Air Force has made photonics one of its technology priorities. The agencies believe the quality of U.S. research is high, but more must be done to keep the nation's commercial lead. Joint government-university-industry projects may be one way to accomplish that.

Industry witnesses agreed that the largest U.S. research problem regarding photonics is translating research into commercially successful devices. They recommended that government continue with its research programs and perhaps fund more applied research through research or purchase contracts. The witnesses acknowledged the difficulties in developing civilian spin-offs from military contracts.

University witnesses also expressed a need for continued government funding, especially for equipment and facilities. They also discussed the need for American nationals to go on to graduate study in the field. Committee Publication Number 100-135.

3.6—SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS

3.6(a)—Hearings on the Space Shuttle Program

The Subcommittee held three days of hearings, April 23, 29, 30, 1987, on the Space Shuttle program. The first of these hearings was part of the Subcommittee's authorization process which focused on NASA's decision to pursue the competitive development of an Advanced Solid Rocket Motor. NASA has proposed this program in response to the requirement in H.R. 5495, the "National Aeronautics and Space Administration Authorization, 1987", that the agency submit to Congress a comprehensive acquisition strategy and plan to continue procurement of Space Shuttle Solid Rocket Motors.

The remaining two days of hearings focused on NASA's recovery from the Challenger accident. To receive testimony from the independent review panels and committees that have been monitoring NASA's recovery efforts. Principal witnesses were Gen. Alton D. Slay, Chairman, Committee on Shuttle Criticality Review and Hazard Analysis Audit, National Research Council; Mr. Joseph F.

Sutter, Chairman, Aerospace Safety Advisory Panel, National Aeronautics and Space Administration; Dr. H. Guyford Stever, Chairman, Panel for the Technical Evaluation of the Redesign of the Space Shuttle Solid Rocket Booster, National Research Council; Mr. Edward E. David, Jr., Chairman, Panel on Post-Challenger Assessment of the Space Shuttle Flight Rates and Utilization; National Research Council; and Maj. Gen. Jasper Welch, Chairman, NASA Advisory Council Task Force on Issues of a Mixed Fleet.

The first hearing revealed that there is general agreement that NASA should pursue the development of an Advanced Solid Rocket Motor, but that there is disagreement regarding the likely impact on motor cost and safety if NASA were to create and maintain a second source of supply for Space Shuttle Solid Rocket Motors.

The second set of hearings indicated that the panels of outside experts that have been assigned responsibility for overseeing NASA's efforts to recover from the Space Shuttle disaster generally believe that the agency is making good progress. On the other hand, there were several areas of continuing concern. These included: NASA's projections regarding likely future Shuttle launch rates; the slow pace at which NASA was acquiring expendable launch vehicles; and the lack of alternative designs for hardware fixes that were under development. Committee Publication Numbers 100-35, Volume II and 100-23.

3.6(b)—Review of NASA's Range Goals

On July 22, 1987, the Subcommittee held a hearing to examine the results of a study recently completed by Dr. Sally K. Ride, Acting Assistant Administrator of NASA's Office of Exploration. Dr. Ride's study was intended to identify major science and exploration options that should be undertaken over the next twenty years. The hearing addressed the technical, social, political, and budgetary factors bearing on the initiatives identified in the study.

Dr. Ride's report will provide a continuous source of guidance to the Subcommittee's efforts to encourage a longer-range perspective in planning the Nation's space program. The Subcommittee expects hearings to continue on the subject. Committee Publication Number 100-27, Volume I.

3.6(c)—Space Station Oversight Hearing

The Subcommittee held a hearing on July 28, 1987, to review the cost, schedule, and performance of NASA's Space Station Program. During the authorization hearings held earlier in the year, NASA announced that the cost of the Space Station which was originally estimated at \$8 billion in 1984 had risen substantially. A panel of the National Research Council presented an interim report which verified these higher cost estimates and also pointed out a number of factors that could lead to further cost increases.

The following witnesses testified before the Subcommittee: Mr. Andrew J. Stofan, Associate Administrator for Office of Space Station, NASA, and Dr. Robert C. Seamans, Senior Lecturer, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology.

The Committee authorized \$767,000,000 for the Space Station in the FY 1988 NASA Authorization, P.L. 100-147. As a result of concerns associated with projected cost growth in the program, the Committee included provisions in the law to contain Space Station funding in the context of the overall NASA budget. (The specific provisions are described in Chapter I, Section 1.2 on P.L. 100-147.) Committee Publication Number 100-41.

3.6(d)—Hearing on the Atlas-Centaur Accident

A hearing on the Atlas-Centaur launch accident was held by the Subcommittee on August 4, 1987. The purpose of the hearing was to understand the direct and indirect causes for the Atlas-Centaur launch accident which occurred on March 26, 1987, and ascertain what actions should be taken by NASA, the Air Force, and the Congress to prevent a recurrence of this or similar incidents.

The following witnesses testified before the Subcommittee: Mr. Jon Busse, Atlas Centaur Program, Goddard Space Flight Center, NASA; Mr. James Womack, Acting Director, Expendable Launch Vehicle Operations, John F. Kennedy Space Center, NASA; Lt. Col. Warburton, Detachment Commander, 11th Detachment, 2nd Weather Squadron, Patrick Air Force Base, Florida; Admiral Richard Truly, Associate Administrator for the Office of Space Flight, NASA, who was accompanied by Mr. Joseph B. Mahon, Deputy Associate Administrator for Space Flight (Flight Systems), NASA, and Mr. John Gibb, Manager, Atlas Centaur Project, Lewis Research Center, NASA; Lt. Gen. Forrest McCartney, Director, John F. Kennedy Space Center, NASA; Maj. Gen. Robert Cromer, Commander, Space and Missile Test Organization, Vandenberg Air Force Base, California, who was accompanied by Col. John Mansur, Commander, of the Air Force Eastern Space and Missile Test Center, Patrick Air Force Base, Florida; Brig. Gen. George Chapman, Commander Air Force Air Weather Service, Scott Air Force Base, Illinois; and Mr. George A. Rodney, Associate Administrator for Safety, Reliability Maintainability and Quality Assurance, NASA.

This hearing demonstrated that there is a compelling need for NASA and the Air Force to update the hardware used to monitor bad weather in the vicinity of Cape Canaveral, and modify the procedures and criteria that are used to determine if the launch of an expendable rocket should be allowed to take place. Committee Publication Number 100-87.

3.6(e)—Shuttle Solid Rocket Motor

A hearing was held on September 16, 1987, on the Redesign of the Space Shuttle's Solid Rocket Motor. At this hearing NASA officials discussed the progress that had been made in the design and development of the Redesigned Solid Rocket Motor that will be used in future Space Shuttle launches and to lay out the Agency's current plans for this element of the Shuttle recovery effort. NASA representatives also presented the results of the test firing of the DM-8 motor that occurred on August 30, 1987.

The following NASA officials presented testimony at this hearing: Admiral Richard Truly, Associate Administrator for Office of

Space Flight; Mr. John Thomas, Manager, Solid Rocket Motor Design Team, Marshall Space Flight Center, Alabama; Mr. Arnold Aldrich, Director, National Space Transportation System, NASA.

This hearing demonstrated that NASA is making excellent progress in its efforts to redesign the Solid Rocket Motor that caused the Challenger accident. Of particular interest were the results of the full-scale static test firing of the Redesigned Solid Rocket Motor which showed that the new joint design prevent combustion gases from reaching the O-rings around the piston casings. Committee Publication Number 100-34.

3.6(f)—Examining the Health of the Commercial Launch Industry

The Subcommittee held hearings on September 15 and 17, 1987, regarding the current health of the commercial launch industry with a particular emphasis on government policies related to its development.

On September 15, 1987, the witnesses for Panel I—Small Launch Providers—were: George A. Koopman, President, American Rocket Company; Mr. Eugene Kadar, President CONATEC, Inc.; Charles M. Chafer, Vice President, Government Relations, Space Services, Inc. Witnesses for Panel II—Large Launch Providers—were: Dr. Alan Lovelace, Corporate Vice President and General Manager, General Dynamics-Space Systems Division; Mr. Richard Brackeen, President, Commercial Titan Systems, Martin Marietta Denver Aerospace; Mr. John Yardley, President, McDonnell-Douglas Astronautics Company.

On September 17, 1987, the witnesses for Panel I—Government Panel—were: Maj. Gen. Robert R. Rankine, Director of Air Force Space and SDI Programs, Department of the Air Force; Mr. Joseph B. Mahon, Deputy Associate Administrator for Flight Systems, Office of Space Flight, NASA; Mr. Courtney Stadd, Director, Office of Commercial Space Transportation, Department of Transportation. Witnesses for Panel II—Satellite Industry Panel—were: Mr. C.J. Waylan, President, GTE Spacenet Corporation; Mr. Stephen D. Dorfman, Vice President and Assistant Group Executive, Hughes Space & Communications Group; Mr. Otto Hoernig, Jr., Vice President, Business Development, CONTEL.

Witnesses were asked to give their assessment of the emerging commercial launch industry, including perspectives on government policies designed to foster the industry and government efforts in its new role as customer of commercial launch services. This also included a discussion of the major terms and conditions of the Air Force range use agreement.

As a result of the hearings, H.R. 3765 was introduced on December 15, 1987, by Rep. Bill Nelson with 21 cosponsors. The legislation would amend the Commercial Space Launch Act to address current impediments to the commercial launch industry. The bill would set forth the standards for determining insurance requirements associated with commercial launch activities, and would define a risk-sharing relationship for launch activities similar to government policies involved in the commercial use of the Space Shuttle. Committee Publication Number 100-79.

3.6(g)—Review NASA's Implementation of NRC Recommendations on Space Station

On October 14, 1987, the Subcommittee held a hearing to review NASA's response to and implementation of the recommendations of the National Research Council on the Space Station program.

The lead witness for NASA was Deputy Administrator, Dale Myers, who was accompanied by the following agency officials: C. Thomas Newman, Assistant Deputy Administrator; Andrew J. Stofan, Associate Administrator for Space Station; Thomas L. Moser, Space Station Program Director; Lennard A. Fisk, Associate Administrator for Space Science and Applications.

The NRC report requested by the White House on the cost and mission of the Space Station, made a number of findings and recommendations ranging from the need to incorporate more test and backup hardware to the need for increased reliability and performance in the space transportation system. This report will serve as a basis for future budget deliberations within the Administration.

The purpose of this hearing was to review the disposition of each of these findings. The NRC report will serve as a valuable asset as the Subcommittee continues its oversight of this major NASA initiative. Committee Publication Number 100-37.

3.6(h)—International Space Policy in the 1990's

A hearing was held on December 10, 1987, to mark the release of a report of the Task Force on International Relations on the subject of international space policy. The report addresses the issue of United States leadership in the civilian space program, concluding that U.S. leadership would be enhanced by institutional changes and goals articulation, among other recommendations. The hearings provided an opportunity to receive testimony from members of the NASA Advisory Council, as well as representatives of NASA, the State Department, and the AIAA.

Witnesses invited to testify at this hearing were: The Honorable James C. Fletcher, Administrator, NASA; Herman Pollack, Chairman, NASA Advisory Council, Task Force on International Relations in Space, NASA; Dr. Jerry Grey, Director, Science and Technology Policy, American Institute for Aeronautics and Astronautics; Michael Michaud, Director, Office of Advanced Technology, Department of State. Committee Publication Number 100-86.

3.6(i)—Hearing on the Shuttle Solid Rocket Motor

The Subcommittee held a hearing on January 27, 1988 to review the results of the Solid Rocket Motor static test firing that occurred on December 23, 1987.

Testimony was received from the following witnesses: Admiral Richard Truly, Associate Administrator, Office of Space Flight, National Aeronautics and Space Administration, Office of Space Flight, National Aeronautics and Space Administration; and Mr. John D. Thirkill, Vice President and General Manager, Space Operations Division, Morton Thiokol, Inc.

The purpose of the hearing was to review the results of the test firing of the motor that was commonly referred to as DM-9. The

hearing focused particularly on the failure of the outer boot ring in the nozzle assembly. Of major interest to the Committee was why this component failed, the probable programmatic and budgetary implications, and what was being done to "recover" from the situation.

The witnesses were unable to explain why the outer boot ring design used in DM-9 failed. Engineering models and preliminary tests had predicted that its performance would be superior to other designs. The witnesses explained, however, that an alternate design was in parallel development and had, in fact, been test fired in the previous full-scale developmental motor, DM-8. This design will be employed in all future test and flight motors. Committee Publication Number 100-76.

3.6(j)—Hearing on Future Goals in Space, New Hampshire

The Subcommittee held the first of two hearings on future space policy on February 1, 1988 in New Hampshire. Republican Presidential Candidates as well as selected space scientists were invited to testify about their views on what space policies should be pursued during the next Administration.

The following witnesses from the Institute for the Study of Earth, Ocean and Space, University of New Hampshire, presented testimony: Dr. Berrien Moore, III, Director; Dr. Roger Arnoldy, Associate Director; Dr. Joseph Hollweg, Dr. Barrett Rock and Admiral J. B. Mooney, Jr., Research Professor. Testimony was also presented by Professor Edward Chupp, Physics Department, University of New Hampshire.

Witness testimony outlined a broad range of goals that should be addressed by the next Administration including a program to address Global change, reversing the decline in our educational system and establishing a more science policy formulation process within the Executive Branch. Committee Publication Number 100-85.

3.6(k)—Hearing on Future Goals in Space, Iowa

The Subcommittee held its second and final hearing on future space policy on February 5, 1988 at the University of Iowa. Democratic Presidential candidates, scientists, and education were invited to participate and present their views on what space policies should be pursued during the next Administration.

The following witnesses appeared from the University of Iowa: Dr. James Van Ellen, Dr. Don Gurnett, Dr. Dwight Nicholson and Dr. Lou Frank from the Department of Physics; Dr. Gene Wubbels, Department of Chemistry of Grinnell College; Dr. Paul Rider of the Department of Chemistry at the University of Northern Iowa; and Mr. Ted Cizadlo, Physics Instructor, City High School, Iowa. The witnesses addressed the need to better integrate the manned and unmanned space programs, the need to invigorate the U.S. space science program and the educational benefits associated with the space sciences. Committee Publications Number 100-85.

3.6(l)—Hearings on the Commercial Space Launch Act Amendments of 1987

H.R. 3765, "Commercial Space Launch Act Amendments of 1987," was the subject of two days of hearings. This legislation, introduced December 15, 1987 by Congressman Bill Nelson (D-FL), and a bipartisan group of 25 cosponsors, is the result of hearings held in September 1987 to review the status of the commercial launch industry.

H.R. 3765 follows the policy precedents established under public law that provided for commercial use of the Space Shuttle. The bill provides standards for the determination of insurance requirements of the commercial launch industry, consistent with government responsibilities under law and international treaty. The legislation also provides incentives to former Shuttle customers to launch on American launch vehicles. Finally, the bill addresses the long-term competitiveness of America's launch industry by requiring the NASA Administrator to design a program in launch vehicle component technology research and development.

At the hearing on February 16, 1988, testimony was received from the following witnesses: Jack O'Brien, General Counsel, NASA; Courtney A. Stadd, Director, Office of Commercial Space Transportation, DOT; Dr. Charles W. Cook, Deputy Assistant for Space Policy, Air Force; Dan Cassidy, Chairman, AIAA Technical Committee on Legal Aspects of Aeronautics and Astronautics; William D. English, Chairman, Subcommittee on Allocation of Space Launch Risks, American Institute for Aeronautics and Astronautics; and Joel Greenberg, President, Princeton Synergetics, Inc.

The hearing on February 17 included the following witnesses:

Panel I: Satellite Industry. The following witnesses presented testimony: George Roberts, President, Contel-ASC; Bruce L. Crockett, President, World Systems Division, COMSAT; Rex Hollis, President, Ford Aerospace Satellite Services Corporation; James H. Frey, General Manager of Spacecraft Operations, General Electric Astro-Space Division.

Panel II: Large Launch Providers. Testimony was received from the following witnesses: John Yardley, President, McDonnell Douglas Astronautics Company; Richard Brackeen, President, Martin Marietta Commercial Titan, Inc., Martin Marietta Denver Aerospace; Dennis R. Dunbar, Program Director of Atlas Centaur, General Dynamics Space Systems Division.

Panel III: Small Launch Providers. Representatives from the following companies presented testimony: Deke Slayton, President, Space Services, Inc., of America; and Wally Boggs, Director of Engineering, E-PRIME Aerospace, Titusville, Florida.

As a result of the hearing, H.R. 3765 was revised and introduced as H.R. 4399 on April 18, 1988, which became Public Law 100-657 (Chapter I, Sec. 1.17). Committee Publication Number 100-114.

3.6(m) Hearing on Orbital Space Debris

The Subcommittee held a hearing on July 13, 1988 to assess the hazard posed by orbital debris in low-earth orbit. The purpose of this hearing was to investigate the potential danger to future missions in low-earth orbit posed by man-made debris fragments. Of

interest to the Committee are protective measures against debris damage currently being explored for major missions such as Space Station, Space and Space Telescope, as well as solutions proposed by government agencies and experts to minimize the future growth of the debris population.

The following witnesses participated in this hearing: Joseph Mahon, Deputy Associate Administrator for Flight Systems, Office of Space Flight, NASA; Philip Kunsberg, Assistant Deputy Under Secretary of Defense for Policy, Department of Defense; Michel Michaud, Director, Office of Advanced Technology, Department of State; Courtney Stadd, Director, Office of Commercial Space Transportation, Department of Transportation; Neil Hosenball, Counsel, Davis, Graham and Stubbs; Nicholas Johnson, Teledyne Brown Engineering Corporation.

The hearing concluded that continued space activity will lead to an unacceptable burden of low-Earth orbital space debris unless specific measures are taken by all space faring nations to ameliorate the problem. Near term needs for characterization of the debris burden between 1 and 10 cm may necessitate certain measurement programs such as high resolution radar techniques. Committee Publication Number 100-112.

3.6(n)—To Establish a National Mars Commission (H.R. 3558)

Background and Summary of Legislation

H.R. 3858 would create a commission of eight members who would be appointed by the Speaker of the House, the President Pro Tempore of the Senate and the President. Six months after enactment of the legislation, the National Mars Commission would send its first joint Mars mission plan to the President and the Congress. In its plan, the Commission would also suggest strategies for avoiding the unwanted exchange of each nation's highly-developed technologies and it would include plans for joint unmanned Mars projects that could lead, ultimately, to a manned mission.

Legislative History

H.R. 3858 was introduced by Congressman Robert G. Torricelli of New Jersey on January 25, 1988. It was jointly referred to the Committee on Science, Space, and Technology, and Foreign Affairs. On March 8, 1988, Mr. Torricelli testified before the Subcommittee on Space Science and Applications on legislation to create a National Mars Commission. The Commission would prepare a plan for a joint U.S.-U.S.S.R. manned mission to Mars. A related bill, S. 2142, was introduced in the Senate by Senator Harkin. On May 4, 1988, the Subcommittee considered H.R. 3858, and incorporated it into H.R. 4561, as section 207. The provisions of H.R. 3858 were enacted as P.L. 100-685.

3.6(o)—Space Settlement Act of 1988 (H.R. 4218)

To require the National Aeronautics and Space Administration to investigate and promote the development of human settlements in space, and for other purposes.

Background and Summary of Legislation

H.R. 4218 would amend the National Aeronautics and Space Act of 1958 to include the following paragraph:

The Congress declares that the extension of human life beyond Earth's atmosphere for the purposes of advancing science, exploration, and development will enhance the general welfare on Earth and that such extension will eventually lead to the establishment of space settlements for the greater fulfillment of those purposes.

This bill would require the National Aeronautics and Space Administration to obtain, produce, and provide information relating to all issues important for the development and establishments of space settlements. These activities would be performed in close cooperation with other agencies, the private sector, academia, and the international community. This legislation also calls for NASA to prepare a report every two years for the Congress and the White House on various issues relating to the establishment of space settlements, including technology needs, techniques for remote resource utilization, site options, architecture options, economic models for financing, mechanisms for international cooperation and sociological issues.

Legislative History

H.R. 4218 was introduced by Congressman George E. Brown, Jr. of California on March 22, 1988, and was referred to the Subcommittee on Space Science and Applications on March 25, 1988. On May 4, 1988, the Subcommittee considered the measure, deciding to incorporate its provisions into H.R. 4561, the Multiyear National Aeronautics and Space Administration Authorization Act, as Section 105. Subsequently, H.R. 4561, as amended, was enacted as P.L. 100-685 (S. 2209).

3.6(p)—John C. Stennis Space Center (H.R. 4560/Executive Order 12541)

To designate the National Space Technology Laboratories in Bay St. Louis, Mississippi, as the "John C. Stennis Space Center."

Background and Summary of Legislation

The National Space Technology Laboratories of the National Aeronautics and Space Administration in Bay St. Louis, Mississippi, is designated as the "John C. Stennis Space Center." Any reference to any law, regulation, document, record, map, or other paper of the United States to such laboratories shall be deemed to be a reference to the John C. Stennis Space Center.

Legislative History

H.R. 4560 was referred to the Committee on May 10, 1988, and subsequently referred to the Subcommittee on Space Science and Applications on May 13, 1988. On May 20, 1988, the provisions of H.R. 4560 were instituted by Executive Order 12641 (Filed with the Office of the Federal Register, May 23, 1988.) A similar provision was also included in S. 2209, the National Aeronautics and Space

Administration Authorization, as agreed to by the House on October 19, 1988.

3.7—SUBCOMMITTEE ON INTERNATIONAL SCIENTIFIC COOPERATION

3.7(a)—Hearings on the Future of the Landsat System

The Subcommittee on International Scientific Cooperation held joint hearings with the Subcommittee on Natural Resources, Agriculture Research and Environment on March 31 and April 2, 1987, on the Future of the Landsat System.

A description of these hearings appears under the Oversight, Investigations and Other Activities of the Subcommittee on Natural Resources, Agriculture Research and Environment [Chapter III, Section 3.3(c)]. Committee Publication Number 100-4.

3.7(b)—International Cooperation on the Superconducting Super Collider

One of more important considerations in ascertaining the total cost of the proposed Superconducting Super Collider is the extent of possible foreign interest in participation in the project. The Subcommittee was concerned that the Administration's effort to formally extend opportunities to participate in the project might occur too late for the Congress to consider the impact of any participation in its funding decision. Furthermore, there was concern about the lack of possible interagency coordination and review of the forms and levels of possible foreign participation, particularly in light of similar problems that arose recently in connection with the Space Station negotiations.

The purpose of the hearing on May 7, 1987, was to review the Department of Energy's activities to date in assessing interest in foreign participation. The witness was George J. Bradley, Jr., Principal Deputy Assistant Secretary for International Affairs and Energy Emergencies. Mr. Bradley outlined the process and the timetable for conducting the Department's assessment and the mechanisms to be used for involvement of relevant federal agencies and the scientific community.

As a result of these hearings, Mr. Hall and Mr. Sensenbrenner jointly introduced H.R. 3463 on October 9, 1987. The bill would direct the Department of Energy to report to Congress by February 15, 1988, on the likely extent and nature of foreign participation in the SSC and would facilitate the interagency process necessary to balance costs and benefits of such foreign participation. The text of H.R. 3463 was incorporated in the SSC authorization bill (H.R. 3228) which passed the Committee on October 15, 1987. Committee Publication Number 100-17.

3.7(c)—Hearings to Examine United States-Soviet Science and Technology Exchanges

U.S.-Soviet Science and Technology (S&T) exchanges have waxed and waned over the past twenty-five years in response to changes in the larger diplomatic relationship. The current S&T relationship appears to be growing moderately, with U.S. participation on a specific project subject to a careful balancing of the costs, such as tech-

nology transfer, and benefits, such as access to Soviet institutions associated with cooperation.

The Subcommittee held two days of hearings on June 23 and 25, 1987. The first day focused on goals, policy objectives, and costs and benefits of U.S.-Soviet S&T cooperation. The second day focused on the interagency process used in reaching decisions on three proposed cooperative projects: 1) U.S.-Soviet Space Cooperation (approved in April, 1987); 2) NSF funding of projects conducted by the International Institute of Applied Systems Analysis (IIASA) (rejected in early 1987); 3) Soviet participation in NSF's Ocean Drilling Program (rejected in 1987 after being approved in 1986). Witnesses from the Departments of State, Defense, National Science Foundation, National Aeronautics and Space Administration, National Academy of Sciences, and technical experts involved in the proposed activities testified.

One result of these hearings, is that the House-passed version of H.R. 3100 (the International Development Cooperation Act of 1987) contains Section 1503, which requires the Comptroller General to report to the Congress on the methods and procedures used to evaluate the effectiveness of current interagency arrangements to review agreements between controlled countries and federal agencies which involve the exchange or transfer of military scientific or technological information. The Committee worked with the Foreign Relations Committee to craft an acceptable substitute amendment that would alleviate concerns that the original amendment was overly broad and could lead to review requirements that would affect all university agreements with foreign institutions. Committee Publication Number 100-26.

3.7(d)—Hearing on Global Prospects for U.S. Coal and Coal Technologies

The Subcommittee on International Scientific Cooperation conducted joint hearings with the Subcommittee on Energy Research and Development on July 21 and July 23, 1987, on Global Prospects for U.S. Coal and Coal Technologies.

A description of the proceedings of these hearings appears in the Oversight, Investigations and Other Activities of the Subcommittee on Energy Research and Development [Chapter III, Section 3.4(v)]. Committee Publication Number 100-40.

3.7(e)—Global Climate Change

The international scientific community and several U.S. federal agencies are embarking on major, comprehensive programs to better understand man's effects on the global environment. These approaches—whether called the Global Change Program, International Geosphere/Biosphere Program, Climate and Global Change, Global Geosciences, or Earth Systems Sciences—are all directed at understanding the Earth on a global scale by describing how its component parts interact, evolve, and function. The program is a response to the realization that the global environment is changing at an unprecedented pace as a result of man's activities, and that the causes and effects of these changes are poorly understood. It is clear that close cooperation between nations and between interna-

tional scientific organizations will be required for the Global Change Program to be truly effective.

On July 29, 1987, the Subcommittee on International Scientific Cooperation convened hearings on international aspects of the "Global Change" program. These hearings reviewed the conclusions of a meeting held earlier in the month by a new international scientific body—the Global Change Committee of the International Council of Scientific Unions (ICSU). Participating in the hearings were three Soviet scientists (two of whom are Members of the ICSU panel), who presented the view of the Soviet Academy of Sciences on the need for an enhanced Global Change Program.

On September 30, 1987, the Subcommittee on International Scientific Cooperation and the Subcommittee on Natural Resources, Agriculture Research and Environment convened joint hearings on proposed federal research programs on Global Change. Witnesses from NASA, NOAA, NSF, DOE, EPA, and the State Department testified on planned and ongoing agency programs in Global Change. Draft legislation promoting national and international coordination of the programs was also considered at the hearing. Committee Publication Number 100--.

3.7(f)—United States-Latin American Cooperation in Science and Technology

Background

The United States has a long history of cooperative programs in science and technology with Latin America. Following a period of bilateral technical assistance prior to 1940, formal cooperation between the U.S. and Latin America in science and technology evolved through efforts of the Organization of American States (OAS), the Agency for International Development (AID), the Inter-American Development Bank (IDB), and many bilateral and multilateral agreements.

In August 1986, the Department of State submitted a report entitled, "Inter-American Science and Technology Cooperation" to Congress as required by an amendment introduced by Congressman Manuel Lujan, Jr. (R-NM) to the 1986-87 Foreign Relations Authorization Act. The report examined past and present Inter-American space, science, and technology cooperation and made recommendations concerning the future of science and technology cooperation in Inter-American relations.

While recognizing the importance of science and technology in U.S. and Latin American relations, the State Department report recommended against a major initiative on both political and economic grounds. The severe economic pressures facing Latin American countries places constraints on the amount of resources available for undertaking joint science and technology projects. The report placed primary reliance for technical cooperation in Latin America on the shoulders of the private sector. However, many U.S. companies are hesitant to locate in Latin America without adequate protection of U.S. intellectual property rights.

Summary of Hearing

The Subcommittee held a hearing on July 30, 1987, with witnesses from various government agencies and the scientific community to examine the history, background information, conclusions, and recommendations contained in the Department of State report. In addition, the hearing focused on prospects for successful scientific cooperation between the United States and Latin America in the future.

Testimony indicated that although there are many political and scientific reasons for desiring increased cooperation with Latin America, existing barriers to such cooperation will be difficult to overcome. Specific ideas for increased cooperation were identified and explored. A trip to Latin America by Members and staff was tentatively planned during the next year to further explore the topic. Committee Publication Number 100--.

3.7(g)—OTA Magnetic Fusion Report "Starpower"

In 1985, the Committee requested that the Office of Technology Assessment (OTA) review the status of magnetic confinement fusion research and compare its progress with the requirements for development of a useful energy technology. OTA's report, completed in September 1987, analyzed the program in three ways: 1) as an energy program, to assess fusion's role in meeting future energy supply needs; 2) as a research program, by discussing its role in training scientists and developing new fields of science and technology; and 3) as an international program, by reviewing the history of international cooperation and the prospects for even more extensive collaboration in the future.

The Subcommittees on Energy Research and Development and International Scientific Cooperation held a joint hearing on October 28, 1987, to receive the testimony of Gerald L. Epstein, Director, Project Staff on Magnetic Fusion Research, Office of Technology Assessment; and Dr. John F. Clarke, Associate Director, Office of Fusion Energy, U.S. Department of Energy. Mr. Epstein summarized the study's findings as follows: Fusion energy could be an attractive source of electricity, but it is too early to tell whether it can be economically produced. Even if successfully developed, it probably will not provide a significant fraction of U.S. electric supply before the middle of the 21st century. The program, to achieve its goals, will either require substantially increased federal outlays or an unprecedented degree of collaboration between the U.S. and other major world fusion programs. However, international collaboration cannot substitute for a strong U.S. research program. Dr. Clarke outlined the status of the Department's current program and the potential for greater collaboration in development of the International Thermonuclear Experimental Reactor (ITER). Committee Publication Number 100--.

3.7(h)—Hearing on Monitoring Technology Flow: Science, Technology and Trade Policy Implications

The hearing was prompted by growing concern among U.S. Government and industry leaders that there is a net flow of technology

and new information out of the United States and that this flow has had an adverse effect on trade balances and industrial competitiveness. Different remedies have recently been proposed, including legislation designed to enhance federal monitoring of comparative access to technology between the U.S. and its major trading partners and to recommend negotiating goals to the United States Trade Representative based on that assessment.

The Subcommittee held a hearing on December 10, 1987, and examined: whether there is a net flow of technology out of the U.S.; what the major avenues are for this flow of technology; and what the policy implications are for science and technology and for the U.S. trade balance. The Subcommittee also used the hearing to assess current legislative proposals, and to consider what other legislative remedies might be helpful in coordinating the measurement of technology flow and the policies developed to address this issue.

Witnesses included representatives from the National Academy of Sciences, U.S. industry, Departments of State and Commerce, the Office of Science and Technology Policy and the National Science Foundation. Committee Publication Number 100-89.

3.7(i)—Science, Technology, and American Diplomacy

The Subcommittee on International Scientific Cooperation conducted oversight pertaining to Title V, Section 503(b), of Public Law 95-426, the Foreign Relations Authorization Act for Fiscal Year 1979. One requirement of the statute is that the Department of State prepare and submit to Congress an annual report reviewing international science and technology activities of federal agencies, including funding data and highlights of developments and activities in bilateral and multilateral agreements or protocols during the year. The report also includes analytical assessments by the Department of State of diplomatic implications of those activities. It is the only U.S. government compilation of international science and technology activities conducted by the Federal Government.

The Committee coordinates jointly with the Committee on Foreign affairs in publishing the Title V report once it is submitted to the Congress by the President. Each Committee takes the lead in alternate years in coordinating the publication process. In 1987, the Science, Space, and Technology Committee took the lead on publishing *Science, Technology, and American Diplomacy 1987*, July 1987, the eighth annual report. In 1988, the Foreign Affairs Committee took the lead on printing *Science, Technology, and American Diplomacy 1988*, April 1988, the ninth annual report. The Department of State changed the format in the ninth edition to shorten and streamline the summary and analytical portions and expand on data presented in tables. The Department had experienced delays in obtaining submittals from some of the federal agencies and asserted that the new format would help the Department to meet the statutory deadline without sacrificing the informative value of the report. The Subcommittee will continue to conduct oversight of future reports to ensure that content is not sacrificed for the sake of easy-to-read tables.

The so-called Title V report is an indispensable resource to the Committee in its oversight efforts. The balance achieved in decisions to cooperate or to strive for preeminence in many scientific disciplines or technological fields depends, in part, upon a rational look at the endeavors in question in light of overall diplomatic relations. Committee publication Numbers 100-D and 100-M (Joint Committee Prints).

3.7(j)—Subcommittee meeting With Western European Union (WEU)

On March 24, 1987, Members of the Subcommittee met with seventeen parliamentarians from the Committee on Scientific and Aerospace Questions of the Western European Union (WEU).

The WEU is a European inter-parliamentary body with seven member states—United Kingdom, France, Italy, Germany, Luxembourg, Netherlands, and Belgium. Party affiliation ranges from conservative to Communist. The WEU was formed in 1948 to protect against future German aggression and to monitor German disarmament. From 1955 to 1984, although it was the only European organization that called for mandatory mutual assistance against aggression, the WEU was largely moribund as its responsibilities were absorbed by NATO. In 1984, however, Germany and France mounted a WEU "revitalization" initiative as a means of strengthening European support for NATO defense and of promoting greater cooperation in European armaments production. The WEU serves as a focal point for European discussions of arms sales, arms control, and security controls.

The visiting delegation assured the Subcommittee Members that the WEU is not intended to detract from the integrity of NATO, and raised the issue of expanded R&D, co-production, and open marketing of weapons systems by the U.S. and Europe. The discussion also ranged extensively over U.S. and European commitments to the SDI program and prospects for U.S./European cooperation in the Space Station.

3.7(k)—United States—Poland Interparliamentary Exchange on Science and Technology

On June 3, 1987, five Members of the Subcommittee met with delegation of three Members of the Polish Sejm (parliament) having interests in science and technology cooperation. The meeting was particularly timely in light of the U.S.-Polish science and technology agreement then being negotiated ("Agreement Between the Government of the United States of America and the Government of the Polish People's Republic on Cooperation in Science and Technology and its Funding", signed September 29, 1987).

U.S.-Polish S&T cooperation was discontinued by the U.S. Government following imposition of martial law in 1981. Negotiations to resume the agreement resumed in 1987, following several positive steps by the Polish Government in the area of human rights. Mr. Kaczmarek, leader of the Polish delegation, strongly encouraged the resumption of S&T cooperation, particularly in the areas of environment, health, food processing and education of young scientists. Subcommittee Members supported such a resumption, pro-

vided that the S&T accord did not serve as an avenue for transfer of militarily critical information or products to the Soviet Union.

3.7(l)—United States-Canada Interparliamentary Exchange

The Subcommittee coordinated a U.S.-Canada Interparliamentary Exchange on June 25, 1987.

The Canadian Parliament had recently created its own science committee, called the Canadian Committee on Research, Science, and Technology, and the visit of Committee members to discuss science and technology policy questions was timely in that Committee's agenda planning. Coming at an early stage in the Subcommittee's existence, this opportunity to meet with another newly created parliamentary group provided a mutually beneficial exploration of agenda-setting and policy questions. Specific issues discussed during the exchange included the SSC, intellectual property rights, and food irradiation.

After discussions on the role of a national legislature in planning and implementing a national science policy, the seven-Member Canadian delegation was invited to join a Subcommittee hearing in progress, Hearings to Examine U.S./Soviet Science and Technology Exchanges.

The Chairman of the U.S. delegation expressed his wish to convene future exchanges with this delegation annually, and the Canadian participants showed a similar interest. Committee Publication Number 100-26.

3.7(m)—European Oversight Trip

The Chairman of the Subcommittee led a Congressional delegation on an oversight trip to Europe August 23-September 1, 1987, with the primary mission of examining Europe's high energy physics research centers in light of the Committee's anticipated consideration of a major initiative proposed in the U.S., the Superconducting Super Collider (SSC). A mission of the delegation was to gain information in order to assess the level of foreign interest in cost-sharing on the SSC and to determine what impact or influence the construction of an SSC would have on worldwide high energy physics research. In this regard, the delegation received on-site tours and briefings of the high-energy research center in Hamburg, Germany, known as Deutsches Elektronen-Synchrotron (DESY), and the European Laboratory for Elementary Particle Physics (CERN), in Geneva, Switzerland.

In addition, the delegation obtained numerous briefings or held meetings with international organizations in Geneva, including: a briefing at the U.S. Mission on the status of arms control negotiations with the Soviet Union; a briefing on U.S. participation in U.N. specialized agencies; and specific, detailed briefings on the World Health Organization and the World Meteorological Organization. In addition, the delegation leader spoke at the first international Seminar on Small- and Medium-Sized Nuclear Reactors in Lausanne, Switzerland, where he stated the Science Committee's commitment to funding advanced nuclear reactor programs, particularly modular high-temperature gas-cooled reactors. He called for greater international cooperation and for the development of

reactors which are sized to meet both the power and energy needs of developing countries, and the specialized needs of the U.S.

In Munich, Germany, the delegation toured and received briefings at the Environmental and Health Research Institute (GSF) on AIDS research and acid rain research; the Karl Suess Group, a manufacturer of high-technology equipment, regarding development of x-ray steppers which may be used in superconducting magnets, and its involvement in X-ray Lithography; the Max Planck Institute for Physics and Astrophysics and Extra Terrestrial Physics and the Institute for Plasma Physics; Messerschmitt-Boelkow-Blohm (MBB) on its SDI and aerospace programs; and the German Aerospace Research Establishment (DFVLR) regarding participation with the U.S. on projects related to the Space Shuttle and Space Station.

In Paris, the delegation met with the European Space Agency regarding cooperative projects with the U.S. on the Space Station (particularly the ESA element, COLUMBUS), Spacelab, the Hubble Space Telescope, and the Solar Terrestrial Science Program.

Other meetings in Paris were with the International Energy Agency (IEA) on its recently released reports on natural gas and Clean Coal Technology; the International Council of Scientific Unions (ICSU) regarding worldwide efforts aimed at understanding man's effect on the global environment; the U.S. Observer Mission to the United Nations Educational, Scientific, and Cultural Organization (UNESCO); and the Coordinating Committee for Multilateral Export Controls (COCOM), particularly to discuss improvements in the organizational structure of COCOM, coordination of enforcement activities of member governments, a recent National Academy of Sciences report on export controls, and the Toshiba-Konigsberg diversion of embargoed goods to the Soviet Union.

A major recommendation to the Committee by the delegation upon its return, with regard to the SSC, is that the Administration should assume a modest level of European cost-sharing in the SSC rather than expect a greater amount and risk needing to make additional budget requests of Congress later. The delegation also offered a set of criteria for the Committee to use in assessing the relative importance of U.S. preeminence in high-energy physics versus other U.S. science and space activities. Committee Publication Serial 100-J.

3.7(n)—International Cooperation on the Superconducting Super Collider

Hearings were held on March 16, 1988, to receive a report from the Department of Energy on its progress in discussions with foreign governments and other potential foreign participants in the SSC project. As a result of these hearings, language contained in H.R. 3228 relating to foreign participation in the SSC was modified and included in H.R. 4505, the DOE Authorization Act for 1989 (see section 2.13). Specifically, H.R. 4505 as reported provided that foreign funding in the SSC should fall between 25 percent and 33⅓ percent of the total project cost and that no more than 33⅓ percent of any single subsystem be foreign-supplied. Committee Publication Number 100-93.

3.7(o)—Competitive Implications of Toxicological Standards and the Need for Consistent International Standards

There is concern among U.S. industry that inconsistent toxicological standards between the United States and other nations may disadvantage American chemical manufacturers. Although international agreement exists on scientific methods used to identify and evaluate carcinogens, agreement does not exist on the type and degree of evidence necessary to classify a carcinogen as a "known", "probable," or "possible" carcinogen.

As a result, various scientific and regulatory organizations including the Environmental Protection Agency (EPA), the National Toxicology Program (NTP), and the International Agency for Research on Cancer (IARC) have devised different categories for classifying carcinogens. These categories are critical because they are used by regulatory agencies in developing safety standards. The European Community utilizes the IARC list; the United States uses EPA and NTP guidelines; and a number of states, including Wisconsin, California, and New York, use a variety of lists when developing regulatory standards for control of these chemicals.

The Subcommittee held one day of public hearings on March 17, 1988 and received testimony from three witnesses: a former Chairman of IARC, a former toxicologist with EPA, and a representative from an industry trade association. The Subcommittee was interested in highlighting the differences between EPA Toxicity standards and those developed by IARC, in assessing the prospects for harmonization of international toxicological standards, and in evaluating competitive problems that could be experienced by American firms as a result of different toxicity classification schemes. In addition, questions for the record were submitted to EPA and NTP.

The Subcommittee expects to continue its oversight of this subject during the 101st Congress. Committee Publication Number 100-97.

3.7(p)—Sharing Foreign Technology: Should We Pick Their Brains?

Part of Japan's economic success in recent years has been attributed to its active national effort to collect, translate, and apply foreign scientific and technical information to meet its own industrial needs. The U.S. has not had a similar coordinated effort on a national scale.

With the passage of the Japan Technical Literature Act in 1986, and the 1987 Executive Order "Facilitating Access to Science and Technology", the federal government is authorized to collect and disseminate foreign scientific and technical information, and to coordinate such activities among various Federal agencies. As a result, the U.S. has begun to recognize the commercial benefits of adopting technological advances developed in other nations.

The objective of this effort is to help the U.S. remain internationally competitive by taking advantage of the free flow of ideas across the global spectrum. But despite these intentions, interest in foreign scientific and technical information remains weak.

The Subcommittee on International Scientific Cooperation convened on April 27, 1988, for a hearing to examine current demands for foreign technical information and policy options which might be

pursued to improve the exchange of this information. Senator Rockefeller underscored the importance of sharing foreign technology and reported on the status of machine translation, on which the Japanese are concentrating. Witnesses from government agencies involved in this effort, including the Department of Commerce, the Department of State, and the National Science Foundation, testified in writing on the activities and initiatives underway in their respective programs. Private sector witnesses emphasized the serious shortfall in demand for this information despite its importance for U.S. competitiveness and rated the effectiveness of several policy recommendations to overcome this shortfall. Committee Publication Number 100--.

3.7(q)—Science and the Summit

Bilateral science and technology exchanges between the United States and the Soviet Union have grown markedly in the past five years and are an increasingly important part of the overall U.S./Soviet relationship. At the conclusion of the May 29–June 1, 1988, summit meeting in Moscow between President Reagan and General Secretary Gorbachev, several new areas for scientific cooperation were added to that relationship: (1) an agreement to fly scientific instruments on each other's spacecraft; (2) an agreement to conduct national studies of solar system exploration to investigate further U.S./Soviet cooperation on such missions; (3) an agreement in transportation science and technology; and (4) a commitment to expand cooperation in global climate and environmental change. Other areas, such as cooperation in basic sciences and in manned exploration of Mars, remain potential areas for U.S./Soviet scientific cooperation.

The Subcommittee heard testimony from Department of State witnesses on June 14, 1988, to review the status of U.S./Soviet cooperation in science, space, and technology in light of the Summit agreements. The discussion focussed on a number of issues. The Agreement in Basic Sciences was discussed but not signed at the summit, because of U.S. concerns that the draft agreement would encourage direct contacts between Soviets and private American companies involved in sensitive technologies. Questions were also raised as to whether the increase in scientific exchanges with the Soviet Union would necessitate reorganized mechanisms or additional resources for U.S. government agencies to conduct national security review. The pros and cons of a cooperative U.S./Soviet Mars mission were also reviewed. Committee Publication Number 100-129.

3.7(r)—Hearing on U.S./Japan Sciences and Technology Agreement

Although the 1980 comprehensive science and technology agreement with Japan raised expectations for cooperative research opportunities, U.S. officials felt that it did little to counterbalance inequities in the U.S./Japan science and technology relationship.

Since 1985, when the agreement was renewed for two years, U.S. officials have sought a higher level of access to high-quality Japanese science and technology research. In Japan, much of the best research of this kind, although Federally funded, is conducted in

private laboratories, and foreign access to these labs has been difficult. In the U.S., on the other hand, much of the best science and technology research is also Federally funded, but is often conducted in universities and Federal laboratories which provide relatively easy access for foreign scientists.

In June, following intensive negotiations, the U.S. and Japan signed a major agreement to renew cooperation on research and development in science and technology. The Administration actively sought this agreement as a means of redressing what appeared to many to be an inequitable flow of scientific and technical information out of this country and into Japan.

The Subcommittee on International Scientific Cooperation convened for a joint hearing with the Subcommittee on Science, Research and Technology on July 13, 1988, to examine whether the U.S. had achieved its objectives with the signing of this agreement. Witnesses from the Department of State were supported by representatives from the Department of Commerce, the National Science Foundation, and the White House Office of Science and Technology Policy.

They detailed the resolution of two key points of contention. On national security, the final agreement contains a provision to prevent leakage of military useful information; on intellectual property rights, the agreement provides that rights will be given on a case-by-case basis, according to the contributions made by each side. Japan also agreed to several specific steps to strengthen the overall science and technology relationship, including: 1) commitment to open research and development systems; 2) continued efforts to improve Japanese language training programs for scientists and engineers; 3) providing, publicizing, and promoting comparable opportunities for U.S. researchers in government-supported research programs; and 4) publishing and distributing key government-funded S&T reports through central sources. Committee Publication Number 100--.

3.8—SUBCOMMITTEE ON TRANSPORTATION, AVIATION AND MATERIALS

3.8(a)—Railroad Technology

Background

The Subcommittee has had a long-standing interest in encouraging the use of modern technology to improve transportation safety. The research and development programs of the Federal Railroad Administration are primarily focused on enhancing the safety of rail transportation by providing a sound basis for rail safety regulations and, through the use of new technology, to improve the safety of track and equipment.

The Subcommittee on Transportation, Aviation and Materials has also had a long-standing interest in high-speed rail technology. In fact, the Committee recommended in a September 1982 report that Congress consider the development of high-speed rail corridors as a key component of future national transportation policies. Although the Federal Government's role has been minimal, it is clear that if the United States is to develop a truly balanced national

transportation system, high-speed rail technology must certainly be considered as a key component.

Summary of Hearings

The Subcommittee on Transportation, Aviation and Materials conducted a hearing February 25, 1987 to examine the January 4th accident in Maryland involving Amtrak and Conrail trains to determine what technological solutions, if any, may be necessary to prevent similar accidents in the future. While the primary focus of the hearing was the adequacy of current rail safety technology such as warning systems and automatic train control systems, the Subcommittee also examined other related human and regulatory factors.

Following the hearing, the Federal Railroad Administration issued safety regulations regarding the operators of trains. Committee Publication Number 100-9.

The Subcommittee on Transportation, Aviation and Materials conducted a field hearing in West Palm Beach, Florida on April 3, 1987 to hear testimony on the status of development of a high-speed railroad system in Florida and the various railroad technologies suitable for use in Florida. Issues addressed at the hearing were track requirements, noise levels, emission of pollutants, safety, initial cost, and long-range maintenance. Committee Publication Number 100-11.

3.8(b)—National Critical Materials Council

Background

The National Critical Materials Act of 1984 (P.L. 98-373), in creating the National Critical Materials Council, called on that Council to take a number of steps to implement a comprehensive national materials program. Two specific requirements included a report assessing the long-range needs for critical materials as well as the establishment of a national federal program plan for advanced materials research and development.

The long-range assessment report on national critical materials needs, due April 1, 1985, took more than three years to complete. Meanwhile, problems related to critical materials continued, including stockpile management and goals, South African policy regarding critical materials, our decline of domestic basic metals and mining capacity, and the increasing competitiveness in the international marketplace for advanced materials and advanced materials technology. With regard to a program plan for advanced materials R&D, despite the requirement for annual revision and coordination with the \$1.5 billion material R&D budget, no final plan has been released. The Committee, through various hearings, reports and assessments, including one currently being conducted by OTA, has identified three critical advanced materials areas as requiring attention: structural ceramics, advanced composites and rapidly solidified alloys. These advanced materials are strategically and economically vital to such programs as SDI, aerospaceplane, SSC and the Space Station. Japan, Western Europe and others have already targeted special national programs in these and other advanced materials areas to provide those nations with a technological edge

for their industries. More recently, the Committee identified the new superconducting materials considered critical to the nation's economic and strategic needs.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing March 31, 1987, to focus on the two reports attempting to understand what steps the Council has taken to implement the law, why they have taken so long in establishing even an agenda of action for the Council, and what now needs to be done to implement these requirements. Outside witnesses specifically focused on problems and concerns related to advanced polymeric composites.

Results of the hearings include the following: a new staff director was appointed and subsequently new staff (technical and non-technical) were assigned to the Council; a preliminary draft of the materials assessment has been completed (November, 1987) and is under agency review; an outline of the Advanced Materials R&D Program Plan document has been produced (December, 1987) and is under development; and the Council, through the Federation of Materials Societies and with the support of the Bureau of Mines, met in January, 1988, with representatives of the private sector to elicit their recommendations regarding advanced materials R&D. Committee Publication Number 100-18.

3.8(c)—Progress in Aviation Weather Prediction and Reporting

Background

The Federal Aviation Act of 1958 (P.L. 85-726) directs the National Weather Service to provide meteorological data to the Federal Aviation Administration that is essential for air commerce. The law also directs the FAA to develop, procure, operate and maintain equipment for disseminating aviation weather information. During the past 10 to 15 years, with the advent of high speed communications and automated data processing, a number of system improvements have been made. However, further improvements are needed to meet both the growing air traffic demands and the need for timely and accurate aviation weather information and services.

Severe weather accounts for about half of the aviation accidents in this country. It is a factor in two-thirds of all U.S. commercial airline delays. Weather has been called the greatest threat to aviation safety, yet pilots report they often do not receive the real-time warnings of precipitation and turbulence essential to take evasive action. These timely forecasts are especially crucial when an aircraft is in the immediate approach or departure area of an airport. The National Transportation Safety Board reports that pilots are usually able to see dangerous weather cells, but often are not afforded the same level of information about storm severity as is broadcast to the public over the radio and television.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing September 30, 1987 to: (1) Receive from the General Accounting Office the results of their two-year assessment

of FAA's plans to employ modern technology to improve the dissemination of severe weather information. (2) Hear FAA's response to this assessment. (3) Investigate the effectiveness of the relationship between the FAA and the National Weather Service with respect to severe storm predictions and warnings for aviation. (4) Compare and contrast the effectiveness of the communications processes for warning the public and for warning tower controllers and pilots of severe weather. (5) Note the progress that has been made to correct shortcomings in the aviation weather warning system, in response to Subcommittee recommendations. Committee Publication Number 100-72.

3.8(d)—Civil Applications of the Tilt Rotor

Background

One of the most important aviation advances likely to take place in the next decade is application of tilt-rotor technology to a variety of civil applications, including short-haul, center-city-to-center-city transportation of passengers.

The tilt rotor is an aircraft capable of both vertical and hovering flight, like a helicopter, and horizontal flight, like a fixed-wing aircraft. The technology was pioneered by NASA in the 1950's, 1960's and 1970's. Currently, the military is developing an aircraft, known as the V-22, that employs tilt rotor technology. In the future, civil versions will be developed to perform a variety of missions.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials (jointly with the Committee on Public Works and Transportation, Subcommittee on Aviation) conducted a hearing November 18, 1987 to update members of the Subcommittees on the technical progress of tilt rotor technology and to examine steps that must be taken to make a civil tilt rotor a reality. These included development of the necessary infrastructure and establishment of appropriate air traffic control procedures. Committee Publication Number 100-68.

3.8(e)—Roles and Mission of the Civil Aeromedical Institute (CAMI)

Background

Established in 1960, the Civil Aeromedical Institute at the Mike Monroney Aeronautical Center in Oklahoma City is charged with a research mission of applying aviation medical knowledge to promote civil aviation safety and the health, safety and efficiency of FAA employees.

Activities conducted at CAMI include research that evaluates human performance of pilots and air traffic controllers; in-flight studies of the effects of equipment and operations on the human body; research into capabilities, limitations and reliability of all personnel; investigation of the effects of drugs and toxic chemicals on the human body; research into survivability of accidents, cabin safety problems, biomedical standards changes to Federal Air Surgeon.

Historically, CAMI has made significant contributions to aeromedicine, especially in the area of cabin safety. In recent years, there

has been some concern that CAMI is underused, underfunded, and understaffed and that its research emphasis has shifted heavily toward analytical responsibilities associated with air traffic controller screening and testing. In addition, the Toxicology Unit of CAMI has been highly scrutinized because of the falsification of chemical analyses of blood samples taken from employees involved in the Conrail-Amtrak collision near Chase, Maryland last January. Although the researcher pleaded guilty to the three felony charges and resigned, the reputation of the Institute has been damaged.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a field hearing in Oklahoma City, Oklahoma on December 7, 1987, to determine if the CAMI mission is proper and if it is being fulfilled, as well as to outline recommendations for the future role of the Institute. There was a consensus that the CAMI resources were valuable and their effective application and use for the FAA must be enhanced to meet their charter requirements. Committee Publication Number 100--.

3.7(f)—Bureau of Mines

Background

A one-day hearing was conducted March 18, 1987, to review the proposed FY 1988 budget for the Department of Interior's Bureau of Mines, as well as to consider long-term research and policy goals of the Bureau. The Bureau requested \$118.6 million for FY 88 (\$19.6 million or 14 percent less than 1987 funding levels). When compared to the Department of the Interior overall, the request followed the same trend established over the past few years—inordinately severe cuts to the Bureau, while little or no cuts were sustained by the Department as a whole. In terms of personnel, the Bureau was asked to cut staff by almost 6 percent, also continuing a trend. Part of the problem is related to the lack of long-term goals and directions of the Bureau.

Summary of Hearing

The Secretary of the Interior's National Strategic Materials and Minerals Program Advisory Committee was invited to share their views on long-term research goals and priorities for the Bureau. The Bureau has taken steps to establish outside advisory panels for evaluation of their R&D efforts. The Bureau has subsequently reorganized with a renewed effort and focus on environmental concerns, including regulations, mining and minerals information and data, and advanced materials. Committee Publication Number 100-19.

3.8(g)—National Aerospaceplane Program

Background

The National Aerospaceplane Program is a joint Department of Defense and National Aeronautics and Space Administration undertaking to develop and demonstrate the technologies which can be applied to a potentially new generation of flight vehicles, com-

prising: (1) launch vehicles capable of single-stage-to-orbit with horizontal-take-off-and-landing; and (2) hypersonic cruise aircraft capable of long-range hypersonic cruise in the atmosphere.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials, jointly with the Subcommittee on Research and Development of the Committee on Armed Services, conducted a hearing March 11, 1987, to examine the technical progress in the program over the last year; operation of the joint management approach; and plans and funding requirements for FY 1988 and beyond. Committee Publication Number 100-25.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials, jointly with the Subcommittee on Research and Development of the Committee on Armed Services, conducted a hearing on March 17, 1988, to examine the technical progress in the program over the last year; technical challenges which lie ahead; the current outlook for future funding; and the current management realignment. Committee Publication Number 100-88.

3.8(h)—Department of Energy Authorizations (H.R. 2368/H.R. 2369)

Summary and Background of Legislation

Transportation R&D

That part of the request for new obligational authority for FY 1988 that is under the jurisdiction of the Subcommittee on Transportation, Aviation and Materials is \$22,009,000. This amount is 60% less than the amount not appropriated for Fiscal Year 1987. Accordingly, the Subcommittee increased this by \$24,791,000 (as follows), making a new total of \$46,800,000: (1) increase the amount for Vehicle Propulsion R&D from \$7.37 million to \$18.5 million; (2) Increase the amount for Electric and Hybrid Vehicle R&D from \$3.4 million to \$6.0 million; (3) Increase the amount for Alternative Fuels Utilization from \$1.1 million to \$1.8 million; (4) Increase the amount for Advanced Materials Development from \$6.657 million to \$16.0 million; (5) Increase the amount for Program Direction from \$1.482 million to \$2.5 million.

Legislation History

H.R. 2368 and H.R. 2369 were introduced by Mrs. Lloyd on May 11, 1987. Both bills reflected the authorization recommendations for FY 1988 of the Subcommittees of jurisdiction: the Subcommittee on Energy Research and Development; the Subcommittee on Natural Resources, Agriculture Research and Environment; and the Subcommittee on Transportation, Aviation and Materials. The bills were retained at the Committee level and were not acted on during the First Session.

The actions of the other subcommittees of jurisdiction are described in Chapter III, Section 3.3(b) (Subcommittee on Natural Resources, Agriculture Research and Environment) and Chapter III, Section 3.4 (Subcommittee on Energy Research and Development).

Committee Publication Numbers 100-10, 33, 38, 39, 42, 48, 49, 58, 60.

3.8(i)—Bureau of Mines

Background

The Bureau of Mines, created in 1910, is responsible for ensuring that the United States has an adequate and dependable supply of minerals and materials to meet its strategic and economic needs. Congress through various legislative mandates has enlarged this basic mission to include health and safety in mineral technology; conservation of helium; R&D for critical and strategic minerals and materials; minerals information and analysis; international minerals assessment; analysis of stockpile requirements; and mineral land use assessment.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing on March 22, 1988, to review the proposed FY 1989 budget for the Department of Interior's Bureau of Mines, as well as to consider long-term research and policy goals of the Bureau. Discussions were held regarding the budget trend, which has been established through the years as one of severe cuts to the Bureau—while little or no cuts were sustained by the Department as a whole. The Bureau requested for FY 1989, \$126.5 million (\$19.8 million or 13.4% less than the FY 1988 estimates). Committee Publication Number 100-100.

3.8(j)—FAA R&D Program Review, NAS Plan, CAMI Mission and Program Plan

Background

The total budget request for the Federal Aviation Administration (FAA) for FY 1989 was \$6.9 billion, which is \$760 million (13%) more than the FY 88 appropriation of \$6.1 billion. The largest part of this (\$3.4 billion) would go to FAA operations especially controllers and inspectors. Of this amount, \$1.5 billion (43%) will be derived from the Airport and Airway Trust Fund, supported mainly by airline ticket taxes. The remainder is appropriated from the General Fund. In 1988, the Trust Fund contribution to Operations was 26%. The budget request for Research, Engineering, and Development for FY 89 is \$155 million, which is virtually identical to the FY 88 current estimate of \$156 million. It is just 72% of the FY 89 authorization, contained in the Airport and Airway Safety and Capacity Expansion Act of 1987. This amount includes personnel and salaries. The source of these funds is the Airport & Airways Trust Fund. The FAA funds research, engineering, and development in two broad areas: (1) to improve the National Airspace System (NAS) of air traffic controllers, facilities, and equipment; and (2) in research outside the NAS: medicine, aircraft safety, security, airborne collision avoidance, airport capacity, and environment.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a two-day hearing May 3 and 4, 1988, to examine why the Administration budget request fell short of the amount the Congress authorized for FY 89 in last year's three year authorization. The hearing also addressed the effect of FAA reorganization proposals on R&D. Another problem addressed at the hearing was the delay of the report by the FAA Administrator on the Civil Aeromedical Institute, which was to "... evaluate potential roles of the Institute in aeromedical research and investigate the possibilities of expanding its activities with respect to human performance research including assessments of pilot/controller errors and stresses, and protection and survival research including work on seat restraining systems, crashworthiness, emergency escape and survival, and fire and smoke toxicity." Also discussed at the hearing were the new rules proposed by the FAA on transponder requirements which are pursuant to legislation in both the Airport and Airway Safety and Capacity Expansion Act and the FY 88 Continuing Resolution. Committee Publication Number 100-107.

3.8(k)—National Critical Materials Council

Background

The National Critical Materials Council, created by P.L. 98-373 in July, 1984 has, to date, failed to achieve the stated purpose of the law. Despite reassurance by Interior Secretary Hodel, Chairman of the Council, funding and staff for the Council remain extremely limited and promised reports required by law have not yet materialized, including an important advanced materials R&D program plan. Meanwhile, important materials R&D programs have been cut back or underfunded in such areas as advanced ceramics, synchrotron radiation facilities and superconductivity. In addition, the Executive Director and one of the three Council members had announced their departure slated as of June of 1988.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing on July 7, 1988 and addressed the following issues: The steps being taken to complete the mandated reports and program plan? Who would replace the departing Member of Executive Director? What are the Administration's plans for the future of the Council? Why has the Council failed to seek adequate staffing and funding for its operations? What specific actions are being taken to address the issues related to advanced ceramics, superconductivity, synchrotron radiation facilities, and other research areas? The national materials assessment was finally completed and released on October 11, 1988. The materials R&D program plan was still unavailable in December, 1988. Committee Publication 100-124.

3.8(l)—R&D on Pollution From Trucks and Buses

Background

In 1985, after years of study, the Environmental Protection Agency issued the last of its truck emission control standards. By 1994, new trucks of all classes will be required to meet very stringent controls for hydrocarbons, carbon monoxide, oxides of nitrogen, evaporative emissions, and particulates.

The truck industry maintains that despite heavy investments in new engine designs, the 1994 emissions standards, especially for nitrogen oxides and particulates, will be very difficult to meet. Proposed amendments to the Clean Air Act now being considered by Congress could require even tougher standards.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing on July 13, 1988 to examine whether trucks and buses, through advancements in engine and emissions control equipment technology, will be able to meet the 1994 standards, or whether technology is being pushed beyond its limits. Issues associated with this would include the contribution of the Department of Energy's Heavy Duty Diesel and Alternative Fuels programs, the economics of developing new engines, competition by foreign manufacturers, and the penalties for nonattainment. Second, it examined the extent that clean alternative fuels such as methanol and natural gas might be used to help buses and trucks meet the required emissions levels. Last, attempts were made to try to determine the future direction of government programs aimed at reducing pollution from transportation. Committee Publication Number 100.120.

3.8(m)—The Medical Mission of the FAA

Background

The Office of Aviation Medicine (OAM) has been given the broad mission of applying aviation medical knowledge and research to the safety and promotion of civil aviation. As head of this office, the Federal Air Surgeon reports directly to the Associate Administrator for Aviation Standards with the one exception that "medical decisions of the Federal Air Surgeon are subject to review only by the Administrator". Aeromedical research falls under two organizations within the OAM: the Biomedical and Behavioral Science Division at FAA Headquarters; and the Civil Aeromedical Institute (CAMI) at the Mike Monroney Aeronautical Center in Oklahoma City.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing on September 14, 1988 to determine whether FAA medical research commands the respect and resources necessary to carry out a coordinated program to improve air safety. This assessment was done, to some extent, through a comparison with military medical research programs. Evidence that this function may be fractured is seen in a recently proposed training initiative

that would separate the psychological aspects of research from the biomedical.

The second purpose of the hearing was to assess the progress of CAMI since the Subcommittee's general oversight hearing in May. The Institute has been operating without a manager for over a year, and there is some question of whether CAMI will be useful to the agency in carrying out elements of human factors research established in two aviation safety bills scheduled for Committee consideration (H.R. 3779 and H.R. 4686). Committee Publication Number 100--.

3.8(n)—Oversight of Computer Security Act of 1987 (P.L. 100-235)

Background

The Computer Security Act of 1987 was signed by the President and became Public Law 100-235 on January 8, 1988. It directs the National Institute of Standards and Technology to establish a computer standards program for Federal computer systems, including guidelines for the security of such systems; requires the Institute to draw upon computer system technical security guidelines developed by the National Security Agency regarding protecting sensitive information; establishes a Computer System Security and Privacy Advisory Board within the Department of Commerce; requires each agency to provide mandatory periodic training in computer security, under guidelines developed by the Institute and regulations issued by the Office of Personnel Management, for all employees involved with the management, use, or operation of computer systems; requires each agency with a Federal computer system to establish a plan for the security and privacy of sensitive information; and requires the submission of such plans to the Institute and the National Security Agency for advice and comment.

Summary of Hearing

The Subcommittee on Transportation, Aviation and Materials conducted a hearing September 22, 1988 to determine whether the Office of Management and Budget (OMB), National Institute of Standards and Technology (NIST), Office of Personnel Management (OPM), National Security Agency (NSA), and General Services Administration (GSA) are making acceptable progress toward implementing the Act. In addition, the Government Accounting Office (GAO) presented the results of its survey of the Federal agencies to determine the nature and extent of their compliance with the Act's provision to identify, by July 8, 1988, all agency systems that contain sensitive information (as defined in the Act).

An important and controversial aspect of the hearing is that NSA has had the de facto leadership role in many computer and network security standards, prior to the enactment of the Act. The major NSA resource to implement this de facto leadership role is the National Computer Security Center. The Committee on Government Operations submitted a statement for the record as to the need to reassess the funding and control of those aspects of the Center that pertain to NIST's responsibility for security standards, as defined in the Act. Committee Publication Number 100--.



APPENDIXES

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY PUBLICATIONS—100TH CONGRESS

Hearings

Date	Title	Publication No.
Jan. 28, 1987.....	Posture Hearing with the Science Advisor to the President.	1.
Feb. 3, 1987.....	Flight of the Voyager.....	2.
Mar. 3, 1987.....	1988 NBS Authorization (H.R. 2160).....	3.
Mar. 31; Apr. 2, 1987.	The Future of the Landsat System.....	4.
Mar. 4, 1987.....	Hearing on the Privatization of the National Technical Information Service, and H.R. 812, the National Quality Improvement Award Act of 1987.	5.
Mar. 24, 25; Apr. 23, 1987.	Oversight on the Federal Aviation Administration Fiscal Year 1988 Research, Engineering and Development Budget Request.	6.
Feb. 26, 1987.....	NASA's Response to the Committee's Investigation of the "Challenger" Accident.	7.
Feb. 26, 1987.....	The Computer Security Act of 1987 (H.R. 145).	8.
Feb. 25, 1987.....	Rail Safety Technology.....	9.
Mar. 3, 1987.....	1988 DOE Authorization (Transportation Programs) (H.R. 2368/H.R. 2369).	10.
Apr. 3, 1987.....	High Speed Rail Technology.....	11.
Feb. 4; Apr. 23, 1987.	National Academy of Sciences Report on International Technology Transfer.	12.
Feb. 19, 25; Mar. 11, 24, 1987.	1988 NSF Authorization (H.R. 2330).....	13.
Mar. 10, 1987.....	Earthquake Reauthorization for Fiscal Year 1988 (H.R. 1612).	14.
May 19, 1987.....	GAO Survey, Federal Government Computer Security.	15.
Mar. 5, 1987.....	Hotel Fire Safety: What's Needed to Protect Our Citizens and Fiscal Year 1988 Authorization for the Federal Fire Prevention and Control Act.	16.
May 7, 1987.....	International Cooperation on the Superconducting Super Collider (SSC).	17.
Mar. 31, 1987.....	National Critical Materials Council.....	18.
Mar. 18, 1987.....	Bureau of Mines Authorization and Oversight.	19.
Mar. 10, 11, 1987.....	1988 NASA Authorization (Volume I) (H.R. 1741).	20.
June 4, 1987.....	Research and Competitiveness in the Construction Industry.	21.
Apr. 28, 29, 30, 1987.	The Role of Science and Technology in Competitiveness.	22.

Hearings—Continued

Date	Title	Publication No.
Apr. 29, 30, 1987	Space Shuttle Recovery (Volume I)	23.
June 25, 1987	Communications and Computers in the 21st Century.	24.
Mar. 11, 1987	National Aero-Space Plane Program (Joint Hearing with the Committee on Armed Services).	25.
June 23, 25, 1987	To Examine U.S.-Soviet Science and Technology Exchanges.	26.
July 22, 1987	NASA's Long-Range Goals (Volume I)	27.
July 29, 1987	The Commercial Development of Medical Biotechnology.	28.
Mar. 3, 1987	Review of Previous Studies	29.
June 17, 1987	H.R. 1414, the Price-Anderson Amendments Act of 1987.	30.
July 15, 1987	Cooperation in Industrial Research and Technology Development.	31.
July 1, 1987	The Effects of Technological Change on the Labor Force.	32.
Mar. 17, 18, 1987	1988 DOE Authorization (Posture Hearing; National Laboratories) (Volume I) (H.R. 2368/H.R. 2369).	33.
Sept. 16, 1987	Results of the Development Motor 8 Test Firing.	34.
Feb. 5, 24, 25; Mar. 3, 5, 10, 11, 18, 19, 31; Apr. 23; May 6, 1987.	1988 NASA Authorization (Volume II) (H.R. 1741).	35.
July 14, 15, 1987	Scientific and Technical Information: Policy and Organization in the Federal Government (H.R. 2159 and H.R. 1615).	36.
Oct. 14, 1987	NASA's Implementation of NRC Recommendations on Space.	37.
Feb. 26; Mar. 4, 1987.	1988 DOE Authorization (Fossil R&D and Clean Coal Technology) (Volume II) (H.R. 2368/H.R. 2369).	38.
Mar. 3, 4, 1987	1988 DOE Authorization (General Science and Research; Basic Energy Sciences) (Volume IV) (H.R. 2368/H.R. 2369).	39.
July 21, 23, 1987	Global Prospects for U.S. Coal and Coal Technologies.	40.
July 28, 1987	Space Station Cost, Schedule, and Performance Oversight.	41.
Feb. 24, 25, 1987	1988 DOE Authorization (Magnetic Fusion Energy; Inertial Confinement Fusion) (Volume III) (H.R. 2368/H.R. 2369).	42.
Apr. 8, 1987	1988 NASA Authorization (Volume III) (H.R. 1741).	43.
June 18, 1987	The Role and Balance of Federal R&D Support.	44.
Nov. 3, 1987	H.R. 2737, The Continental Scientific Drilling and Exploration Act (Joint Hearing with the Committee on Interior and Insular Affairs).	45.
Step. 23, 1987	Hydrogen: Fuel of the Future	46.
July 15, 16, 1987	Geosciences	47.
Mar. 19, 24, 1987	1988 DOE Authorization (Nuclear Waste; Uranium Enrichment) (Volume VI) (H.R. 2368/H.R. 2369).	48.
Mar. 5, 11, 1987	1988 DOE Authorization (Solar and Other Renewables) (Volume VI) (H.R. 2368/H.R. 2369).	49.

Hearings—Continued

Date	Title	Publication No.
Oct. 28, 1987.....	OTA Magnetic Fusion Report "Star-power".	50.
Nov. 4, 1987.....	Corporate Giants and Global Competition: Dynamos or Dinosaurs.	51.
Oct. 12, 1987.....	Technology Transfer.....	52.
Mar. 10, 12, 1987.....	Stratospheric Ozone Depletion.....	53.
Apr. 1, 1987.....	EPA R&D Fiscal Year 1988 Budget Request (H.R. 2355).	54.
June 25, 1987, 1987..	H.R. 1905, The University Research Facilities Revitalization Act of 1987.	55.
Oct. 20, 1987.....	Superconductivity.....	56.
Oct. 7, 1987.....	Superconductivity.....	57.
Mar. 19, 25; Apr. 23, 1987.	1988 DOE Budget Authorization: Environmental R&D (H.R. 2368/H.R. 2369).	58.
July 21, 1987.....	H.R. 2253, The Ground Water Research, Development and Demonstration Act, and H.R. 791, The National Ground Water Contamination Information Act of 1987.	59.
Mar. 17, 18, 1987.....	1988 DOE Authorization (Nuclear Fission) (Volume V) (H.R. 2368/H.R. 2369).	60.
Oct. 1, 1987.....	1988 NOAA Authorization (S. 1667).....	61.
Oct. 9, 1987.....	Federal Science and Technology Support for Historically Black Colleges and Universities.	62.
Nov. 10, 1987.....	Whittier Narrows, CA, Earthquake: Lessons Learned.	63.
Oct. 1, 1987.....	Automobile Development and Production...	64.
Sept. 17, 1987.....	Opportunities for International Scientific Cooperation to Control AIDS.	65.
Oct. 22, 1987, 1987..	Technology and Economics In a Shrinking World.	66.
Sept. 9, 1987.....	Collision Avoidance Technology.....	67.
Nov. 18, 1987.....	Civil Applications of the Tilt Rotor.....	68.
June 10, 1987.....	Superconductivity.....	69.
May 28; Sept. 22, 1987.	Biological Diversity: Prospects and Problems.	70.
Nov. 30, 1987.....	Groundwater Resources on Long Island (Joint Hearing with the Committee on Environment and Public Works,—U.S. Senate).	71.
Sept. 30, 1987.....	Progress in Aviation Weather Prediction and Reporting.	72.
July 22, 23, 29; Sept. 30, 1987.	The National Climate Program Act and Global Climate Change.	73.
July 8, 9, 1987.....	Renewable Energy Development.....	74.
July 30, 1987.....	U.S.-Latin American Cooperation for Science and Technology.	75.
Jan. 27, 1988.....	Tests of the Redesigned Solid Rocket Motor Program.	76.
Oct. 29, 1987.....	Review of the Results of the Antarctic Ozone Expedition.	77.
Dec. 7, 1987.....	Roles and Mission of the Civil Aeromedical Institute (CAMI).	78.
Sept. 15, 17, 1987.....	State of the Commercial Launch Industry..	89.
Apr. 7, 8, 9, 1987.....	Superconducting Super Collider.....	80.
Feb. 23, 1988.....	1988 Science and Technology Posture Hearing with the Director of the Office of Science and Technology Policy.	81.
Mar. 8, 1988.....	The Modernization of the Weather Service.	82.

Hearings—Continued

Date	Title	Publication No.
Feb. 5, 1988.....	Economic Development through Technology Transfer.	83.
Feb. 24, 1988.....	National Technical Information Service	84.
Feb. 1, 5, 1988.....	Future Goals in Space.....	85.
Dec. 10, 1987.....	International Space Policy for the 1990's and Beyond.	86.
Aug. 4, 1987.....	The Atlas/Centaur 67 Launch Mishap.....	87.
Mar. 17, 1988.....	Fiscal Year 1989 NASA Aero-Space Plane Authorization (Joint Hearing with the Committee on Armed Services).	88.
Dec. 10, 1987.....	Monitoring Technology Flow: Science, Technology and Trade Policy Implications.	89.
Feb. 8, 1988.....	University/Industry Alliances.....	90.
Mar. 31, 1988.....	Fiscal Year 1989 DOE Budget Authorization: Environmental R&D.	91.
Mar. 23, 1988.....	Update on the Status of Landsat Commercialization.	92.
Mar. 16, 1988.....	International Participation in the Superconducting Super Collider (SSC).	93.
Apr. 12, 13, 1988	1989 NASA Authorization (Volume I).....	94.
Nov. 9, 1987.....	Scientific and Technical Literacy in the Work Force.	95.
Mar. 15, 16, 1988.....	1989 NBS Authorization.....	96.
Mar. 17, 1988.....	The International Competitive Implications of Toxicological Standards: The Need for Consistent International Standards.	97.
Mar. 10, 1988.....	Fiscal Year 1989 Authorization of the Federal Fire Prevention and Control Act.	98.
Mar. 2, 10, 1988.....	The Hotel and Motel Fire Safety Act.....	99.
Mar. 22, 1988.....	Bureau of Mines Authorization and Oversight.	100.
Mar. 24, 1988.....	1989 DOE Authorization (Transportation Programs).	101.
June 23, 1988.....	New Directions for Home Video	102.
Mar. 30, 1988.....	1989 DOE Authorization (Magnetic Fusion Energy) (Volume VI).	103.
Nov. 21, 1987.....	Groundwater Contamination.....	104.
June 6, 1988.....	The Quality of Medical Care: Information for Consumers.	105.
Feb. 17, 1988.....	Oversight of Science and Technology Policy.	106.
May 3, 4, 1988.....	FAA R&D Program Review, NAS Plan, CAMI Mission, and Program Plan.	107.
May 5, 1988	Field Testing Genetically-Engineered Organisms.	108.
June 16, 1988.....	The Controller Performance Research Act; and the Aviation Safety Research Act of 1988.	109.
July 8, 1988	Technology Transfer: A New Contact Sport.	110.
July 28, 1988	Fire Safety Multi-Family Housing.....	111.
July 13, 1988	Orbital Space Debris.....	112.
Aug. 4, 1988.....	Steel Research and Markets of the Future.	113.
Feb. 16, 17, 1988.....	H.R. 3765, the Commercial Space Launch Act Amendments.	114.
Mar. 22, 23, 24, 1988.	1989 NSF Authorization	115.

Hearings—Continued

Date	Title	Publication No.
Apr. 21, 1988	Oversight of the Fiscal Year 1989 EPA Research Budget Request.	116.
Mar. 15, 1988	1989 DOE Authorization (Uranium Enrichment) (Volume III).	117.
June 23, 1988	High-Temperature Superconductivity Technology Transfer.	118.
Sept. 15, 1988	S. 2470, the Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988.	119.
July 13, 1988	R&D on Pollution from Trucks and Buses..	120.
Mar. 3, 8, 9, 10, 22, 23, 24, 29, 30, 31, 1988.	1989 NASA Authorization (Volume II)	121.
July 27, 1988	National Laboratory Competitiveness Act of 1988.	122.
Apr. 6, 1988	Environmental Health in the 21st Century.	123.
July 7, 1988	National Critical Materials Policy	124.
Apr. 27, 1988	National Acid Precipitation Assessment Program.	125.
June 30, 1988	H.R. 4226, Renewable Energy and Energy Conservation Commercialization and Development Act.	126.
Aug. 9, 1988	Counterfeit Bolts and Fasteners	127.
May 13, 1988	The State of the U.S. Oil and Gas Industry.	128.
June 14, 1988	Science and the Summit	129.
June 8, 24, 1988	Explosion at the Pacific Engineering Oxidizer Production Plant: Local Impact and Recovery Activities.	130.
June 27, 1988	The Cutting Edge: Science and Technology for America's Future.	131.
Aug. 10, 1988	H.R. 5000, Recyclable Materials: Plastic in the Environment.	132.
June 22, 1988	Technologies for Conserving Species: Saving the Endangered Rhinoceros.	133.
June 28, 1988	Women, Minorities, and the Disabled in Science and Technology.	134.
May 2, 1988	Photonics	135.
Mar. 25, 1988	Work for Others and Technology Transfer.	136.
June 29, 1988	Technologies for Remediating Global Warming.	137.

REPORTS

Date	Title	Publication No.
June 1987	An Agenda for a Study of U.S. Technology Policy.	A.
July 1987	Prospects for Sustainable Development in Sub-Saharan Africa.	B.
September 1987	Brick and Mortar: A Summary and Analysis of Proposals to Meet Research Facilities Needs on College Campuses.	C.
July 1987	Science, Technology, and American Diplomacy 1987 (Joint Committee Print with the Committee on Foreign Affairs).	D.
November 1987	Technology Policy Task Force Hearing Summary (Review of Previous Studies).	E.

REPORTS—Continued

Date	Title	Publication No.
November 1987	Technology Policy Task Force Hearing Summary (The Technical Enterprise for Computers, Communications, and Manufacturing in the 21st Century).	F.
November 1987	Appendices to—Brick and Mortar: A Summary and Analysis of Proposals to Meet Research Facilities Needs on College Campuses (Serial C).	G.
November 1987	Technology Policy Task Force Hearing Summary (The Effects of Technological Change on the Labor Force).	H.
October 1987	Space Activities of the United States, Soviet Union, and Other Launching Countries: 1957-1986.	I.
October 1987	Oversight Visit to Europe	J.
November 1987	Technology Policy Task Force Hearing Summary (The Commercial Development of Medical Biotechnology).	K.
December 1987	Summary of Activities (First Session)	L.
April 1988	Science, Technology, and American Diplomacy 1988 (Joint Committee Print with the Committee on Foreign Affairs).	M.
June 1988	Oversight Review of South American Science, Space, and Technology.	N.
September 1988	Commercialization of Federally Funded R&D: A Guide to Technology Transfer from Federal Laboratories.	O.
July 1988	Space Activities of the United States, Soviet Union, and Other Launching Countries: 1957-1987.	P.
October 1988	Oversight Review of European Science and Technology Activities and Policies.	Q.
May 18, 1987	National Quality Improvement Act of 1987 (Report to accompany H.R. 812).	H.Rept. 100-96.
May 19, 1987	National Bureau of Standards Authorization Act for Fiscal Year 1988 (Report to accompany H.R. 2160).	H.Rept. 100-98.
May 21, 1987	Earthquake Hazards Reduction Act of 1977: Authorization for Fiscal Years 1988 and 1989 (Report to accompany H.R. 1612).	H.Rept. 100-89, Part 2.
May 21, 1987	Federal Fire Prevention and Control Act of 1974: Authorization for Fiscal Year 1988 (Report to accompany H.R. 1522).	H.Rept. 100-103
May 28, 1987	National Science Foundation Authorization Act for Fiscal Year 1988 (Report to accompany H.R. 2330).	H.Rept. 100-110.
May 28, 1987	The Environmental Research, Development, and Demonstration Authorization Act of 1987 (Report to accompany H.R. 2355).	H.Rept. 100-111.
June 3, 1987	Airport and Airway Improvement Amendments of 1987 (Report to accompany H.R. 2310).	H.Rept. 100-123, Part 1.
June 11, 1987	Computer Security Act of 1987 (Report to accompany H.R. 145).	H.Rept. 100-153, Part 1.
July 7, 1987	National Aeronautics and Space Administration Authorization Act, Fiscal Year 1988 (Report to accompany H.R. 2782).	H.Rept. 100-204.
July 22, 1987	Price-Anderson Amendments Act of 1987 (Report to accompany H.R. 1414).	H.Rept. 100-104, Part 2.

REPORTS—Continued

Date	Title	Publication No.
Aug. 4, 1987	Technology Competitiveness Act of 1987 (Report to accompany H.R. 2916).	H.Rept. 100-266.
Sept. 30, 1987	The National Ground Water Research and Protection Assistance Act of 1987 (Report to accompany H.R. 791).	H.Rept. 100-155, Part 4.
Oct. 6, 1987	Aircraft Collision Avoidance Act of 1987 (Report to accompany H.R. 1517).	H.Rept. 100-286, Part 2.
Oct. 27, 1987	National Oceanic and Atmospheric Administration Atmospheric and Satellite Program Authorization Act of 1987 (Report to accompany H.R. 1667).	H.Rept. 100-406.
Oct 29, 1987	Superconducting Super Collider Authorization Act of 1987 (Report to accompany H.R. 3228).	H.Rept. 100-413.
May 2, 1988	Continental Scientific Drilling and Exploration Act (Report to accompany H.R. 2737/S. 52).	H.Rept. 100-580, Part 2.
Apr. 27, 1988	Authorizing Appropriations for Activities under the Federal Fire Prevention and Control Act of 1974 (Report to accompany H.R. 4419).	H.Rept. 100-589.
May 19, 1988	Department of Energy Civilian Energy Research and Development Programs Authorization Act for Fiscal Year 1989 (Report to accompany H.R. 4505).	H.Rept. 100-636.
May 19, 1988	Commercial Space Launch Act Amendments of 1988 (Report to accompany H.R. 4399).	H.Rept. 100-639.
May 24, 1988	National Science Foundation Authorization Act for Fiscal Years 1989 and 1990 (Report to accompany H.R. 4418).	H.Rept. 100-649.
May 24, 1988	Multiyear National Aeronautics and Space Administration Authorization Act (Report to accompany H.R. 4561).	H.Rept. 100-650.
June 3, 1988.....	National Bureau of Standards Authorization Act for Fiscal Year 1989 (Report to accompany H.R. 4417).	H.Rept. 100-673, Part 1.
Sept. 8, 1988	Controller Performance Research Act (Report to accompany H.R. 3779).	H.Rept. 100-893.
Sept. 8, 1988	Aviation Safety Research Act of 1988 (Report to accompany H.R. 4686).	H.Rept. 100-894.
Sept. 8, 1988	Research and Development on Fatigue and Corrosion in Aging Aircraft (Report to accompany H. Res. 450).	H.Rept. 100-895.
Sept. 9, 1988	The National Superconductivity and Competitiveness Act of 1988 (Report to accompany H.R. 3048).	H.Rept. 100-900.
Sept. 15, 1988	Establishment of a United States Decade for Natural Disaster Reduction (Report to accompany H.Con. Res. 290).	H.Rept. 100-920.
Sept. 20, 1988	The Department of Energy Laboratory Competitiveness Act of 1988 (Report to accompany H.R. 5132).	H.Rept. 100-943, Part 1.
Sept. 22, 1988	Hotel and Motel Fire Safety Act of 1988 (Report to accompany H.R. 3704).	H.Rept. 100-956.
Sept. 28, 1988	The Biotechnology Science Coordination and Competitiveness Act of 1988 (Report to accompany S. 1966).	H.Rept. 100-992, Part 1.
Sept. 28, 1988	The Biotechnology Science Coordination and Competitiveness Act of 1988 (Report to accompany H.R. 4502).	H.Rept. 100-993, Part 1.

REPORTS—Continued

Date	Title	Publication No.
Oct. 6, 1988	Steel and Aluminum Energy Conservation and Technology Competitiveness Act of 1988 (Report to accompany S. 2470).	H.Rept. 100-1061.
Oct. 6, 1988	National Nutrition Monitoring and Related Research Act of 1988 (Report to accompany S. 1081).	H.Rept. 100-1067, Part 1.
Oct. 19, 1988	Technology Policy and Its Effect on the National Economy (Report of the Technology Policy Task Force).	H.Rept. 100-1093.

MEMBERS OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY 100TH CONGRESS—INDIVIDUAL DATA

Member	State/ District	House of Representa- tives Service	Committee Service	Other committee assignments 100th
DEMOCRATS				
Robert A. Roe	NJ/8th	1969-	1971-	Public Works and Transportation; Permanent Select Committee on Intelligence.
George E. Brown, Jr.	CA/36th	1963-1970 1973-	1965-1970 1973-	Agriculture.
James H. Scheuer	NY/8th	1965-1972 1975-	1975-	Energy and Commerce; Joint Economic Committee; Select Committee on Narcotics Abuse and Control.
Marilyn Lloyd	TN/3rd	1975-	1975-	Armed Services; Select Committee on Aging.
Doug Walgren	PA/18th	1977-	1977-	Energy and Commerce.
Dan Glickman	KS/4th	1977-	1977-	Agriculture; Judiciary; Permanent Select Committee on Intelligence.
Harold L. Volkmer	MO/9th	1977-	1977-	Agriculture; Select Committee on Aging.
Bill Nelson	FL/11th	1979-	1979-	Banking, Finance and Urban Affairs.
Ralph M. Hall	TX/4th	1981-	1981-	Energy and Commerce.
Dave McCurdy	OK/4th	1981-	1981-	Armed Services.
Norman Y. Mineta	CA/30th	1975-	1983-	Public Works and Transportation.
Buddy MacKay	FL/6th	1983-1988	1983-1988	Budget; Select Committee on Aging.
Tim Valentine	NC/2nd	1983-	1983-	Public Works and Transportation.
Robert G. Torricelli	NJ/9th	1983-	1983-	Foreign Affairs.
Rick Boucher	VA/9th	1983-	1983-	Education and Labor; Select Committee on Aging.
Terry L. Bruce	IL/19th	1985-	1985-	Energy and Commerce.
Richard H. Stallings	ID/2nd	1985-	1985-	Agriculture; Select Committee on Aging.
Janes A. Traficant, Jr.	OH/17th	1985-	1985-	Public Works and Transportation; Select Committee on Narcotics Abuse.
Jim Chapman	TX/1	1985-	1986-	Public Works and Transportation.
Lee H. Hamilton	IND/9	1965-	1987-	Foreign Affairs; Joint Economic Committee; Select Committee to Investigate Covert Arms Transactions with Iran.
Henry J. Nowark	NY/33	1975-	1987-	Public Works and Transportation.
Carl C. Perkins	KY/7	1984-	1987-	Education and Labor; Public Works and Transportation.
C. Thomas McMillen	MD/4	1987-	1987-	Banking, Finance and Urban Affairs.

MEMBERS OF THE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY 100TH CONGRESS—INDIVIDUAL DATA—Continued

Member	State/ District	House of Representa- tives Service	Committee Service	Other committee assignments 100th
David E. Price	NC/4	1987-.....	1987-.....	Banking Finance and Urban Affairs; Small Business.
David R. Nagle	IA/3	1987-.....	1987-.....	Agriculture.
Jimmy Hayes	LA/7	1987-.....	1987-.....	Public Works and Transpor- tation.
David E. Skaggs	CO/2	1987-.....	1987-.....	Public Works and Transpor- tation; Select Committee on Children, Youth and Families.
Paul E. Kanjorski	PA/11	1985-.....	1987-.....	Banking Finance and Urban Affairs; Veterans Affairs.
George J. Hochbrueckner.	NY/1	1987-.....	1987-.....	Armed Services; Merchant Marine and Fisheries.
REPUBLICANS				
Manuel Lujan	NM/1st	1969-1988	1977-1988	Interior and Insular Affairs.
Robert S. Walker	PA/16th	1977-.....	1977-.....	Government Operations.
F. James Sensenbrenner, Jr.	WS/9th	1979-.....	1981-.....	Judiciary.
Claudine Schneider	RI/2nd	1981-.....	1981-.....	Merchant Marine and Fish- eries; Select Committee on Aging.
Sherwood L. Boehlert	NY/25th	1983-.....	1983-.....	Public Works and Transpor- tation.
Tom Lewis	FL/12th	1983-.....	1983-.....	Agriculture; Select Commit- tee on Narcotics Abuse and Control.
Don Ritter	PA/15th	1979-.....	1979-1980	Energy and Commerce.
Sid W. Morrison	WA/4th	1981-.....	1985-.....	Agriculture; Select Commit- tee on Hunger.
Ron Packard	CA/43rd	1983-.....	1985-.....	Public Works and Transpor- tation.
Robert C. Smith	NH/1st	1985-.....	1985-.....	Veterans Affairs.
Pual B. Henry	MI/5th	1985-.....	1985-.....	Education and Labor.
Harris W. Fawell	IL/13th	1985-.....	1985-.....	Education and Labor; Select Committee on Aging.
D. French Slaughter, Jr. ..	VA/7th	1985-.....	1985-.....	Small Business; Judiciary.
Lamar Smith	TX/21	1987-.....	1987-.....	Judiciary.
Ernest L. Konnyu	CA/12	1987-1988	1987-1988	Merchant Marine and Fish- eries.
Jack Buechner	MO/2	1987-.....	1987-.....	Budget.
Joel Hefley	CO/5	1987-.....	1987-.....	Small Business.
Constance A. Morella	MD/8	1987-.....	1987-.....	Post Office and Civil Service.
Christopher Shays	CT/4	1987-.....	1987-.....	Government Operations.

COMMITTEE MEMBERSHIP 85TH CONGRESS THROUGH 99TH CONGRESS

COMMITTEE ON SCIENCE AND TECHNOLOGY

99TH CONGRESS, 1985-1986

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey
 GEORGE E. BROWN, Jr., California
 JAMES H. SCHEUER, New York
 MARILYN LLOYD, Tennessee
 TIMOTHY E. WIRTH, Colorado
 DOUG WALGREN, Pennsylvania
 DAN GLICKMAN, Kansas
 ROBERT A. YOUNG, Missouri
 HAROLD L. VOLKMER, Missouri
 HOWARD WOLPE, Michigan*
 BILL NELSON, Florida
 STAN LUNDINE, New York
 RALPH M. HALL, Texas
 DAVE McCURDY, Oklahoma
 NORMAN Y. MINETA, California
 MICHAEL A. ANDREWS, Texas
 BUDDY MacKAY, Florida*
 TIM VALENTINE, North Carolina
 HARRY M. REID, Nevada
 ROBERT G. TORRICELLI, New Jersey
 RICK BOUCHER, Virginia
 TERRY BRUCE, Illinois
 RICHARD H. STALLINGS, Idaho
 BART GORDON, Tennessee
 JAMES A. TRAFICANT, Ohio

MANUEL LUJAN, Jr., New Mexico
 ROBERT S. WALKER, Pennsylvania
 F. JAMES SENSENBRENNER, Jr.,
 Wisconsin
 CLAUDINE SCHNEIDER, Rhode Island
 SHERWOOD BOEHLERT, New York
 TOM LEWIS, Florida
 DON RITTER, Pennsylvania
 SID W. MORRISON, Washington
 RON PACKARD, California
 JAN MEYERS, Kansas
 ROBERT C. SMITH, New Hampshire
 PAUL B. HENRY, Michigan
 HARRIS W. FAWELL, Illinois
 WILLIAM W. COBEY, Jr., North Carolina
 JOE BARTON, Texas
 D. FRENCH SLAUGHTER, Jr., Virginia
 DAVID S. MONSON, Utah

*Serving on the Committee on the Budget, 99th Congress.

COMMITTEE ON SCIENCE AND TECHNOLOGY

98TH CONGRESS, 1983-1984

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey
 GEORGE E. BROWN, JR., California
 JAMES H. SCHEUER, New York
 RICHARD L. OTTINGER, New York
 TOM HARKIN, Iowa
 MARILYN LLOYD, Tennessee
 TIMOTHY E. WIRTH, Colorado*
 DOUG WALGREN, Pennsylvania
 DAN GLICKMAN, Kansas
 ALBERT GORE, JR., Tennessee
 ROBERT A. YOUNG, Missouri
 HAROLD L. VOLKMER, Missouri
 HOWARD WOLPE, Michigan*
 BILL NELSON, Florida
 STAN LUNDINE, New York
 RALPH M. HALL, Texas
 DAVE McCURDY, Oklahoma
 MERVYN M. DYMALLY, California
 PAUL SIMON, Illinois
 NORMAN Y. MINETA, California
 RICHARD J. DURBIN, Illinois
 MICHAEL A. ANDREWS, Texas
 BUDDY MacKAY, Florida
 TIM VALENTINE, North Carolina
 HARRY M. REID, Nevada
 ROBERT G. TORRICELLI, New Jersey
 RICK BOUCHER, Virginia

LARRY WINN, JR., Kansas
 MANUEL LUJAN, JR., New Mexico
 ROBERT S. WALKER, Pennsylvania
 WILLIAM CARNEY, New York
 F. JAMES SENSENBRENNER, JR.,
 Wisconsin
 JUDD GREGG, New Hampshire
 RAYMOND J. McGRATH, New York
 JOE SKEEN, New Mexico
 CLAUDINE SCHNEIDER, Rhode Island
 BILL LOWERY, California
 ROD CHANDLER, Washington
 HERBERT H. BATEMAN, Virginia
 SHERWOOD L. BOEHLERT, New York
 ALFRED A. McCANDLESS, California
 TOM LEWIS, Florida

*Serving on the Committee on the Budget, 98th Congress.

COMMITTEE ON SCIENCE AND TECHNOLOGY

97TH CONGRESS, 1981-1982

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey	LARRY WINN, Jr., Kansas
GEORGE E. BROWN, Jr., California	BARRY M. GOLDWATER, Jr., California
JAMES H. SCHEUER, New York	HAMILTON FISH, Jr., New York
RICHARD L. OTTINGER, New York	MANUEL LUJAN, Jr., New Mexico
TOM HARKIN, Iowa	HAROLD C. HOLLENBECK, New Jersey
MARILYN LLOYD BOUQUARD, Tennessee	ROBERT S. WALKER, Pennsylvania
JAMES J. BLANCHARD, Michigan	EDWIN B. FORSYTHE, New Jersey
TIMOTHY E. WIRTH, Colorado*	WILLIAM CARNEY, New York
DOUG WALGREN, Pennsylvania	MARGARET M. HECKLER, Massachusetts
RONNIE G. FLIPPO, Alabama	F. JAMES SENSENBRENNER JR., Wisconsin
DAN GLICKMAN, Kansas	VIN WEBER, Minnesota
ALBERT GORE, Jr., Tennessee	JUDD GREGG, New Hampshire
ROBERT A. YOUNG, Missouri	RAYMOND J. McGRATH, New York
RICHARD C. WHITE, Texas	JOE SKEEN, New Mexico
HAROLD L. VOLKMER, Missouri	CLAUDINE SCHNEIDER,, Rhode Island
HOWARD WOLPE, Michigan	JIM DUNN, Michigan
BILL NELSON, Florida	BILL LOWERY, California
STAN LUNDINE, New York	
ALLEN E. ERTEL, Pennsylvania	
BOB SHAMANSKY, Ohio	
RALPH M. HALL, Texas	
DAVE McCURDY, Oklahoma	
MERVYN M. DYMALLY, California	

*Serving on the Committee on the Budget, 97th Congress.

COMMITTEE ON SCIENCE AND TECHNOLOGY

96TH CONGRESS 1979-1980

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey
 MIKE McCORMACK, Washington
 GEORGE E. BROWN, Jr., California
 JAMES H. SCHEUER, New York
 RICHARD L. OTTINGER, New York
 TOM HARKIN, Iowa
 JIM LLOYD, California
 JEROME A. AMBRO, New York
 MARILYN LLOYD BOUQUARD, Tennessee
 JAMES J. BLANCHARD, Michigan
 TIMOTHY E. WIRTH, Colorado*
 DOUG WALGREN, Pennsylvania
 RONNIE G. FLIPPO, Alabama
 DAN GLICKMAN, Kansas
 ALBERT GORE, Jr., Tennessee
 WES WATKINS, Oklahoma
 ROBERT A. YOUNG, Missouri
 RICHARD C. WHITE, Texas
 HAROLD L. VOLKMER, Missouri
 DONALD J. PEASE, Ohio
 HOWARD WOLPE, Michigan
 NICHOLAS MAVROULES, Massachusetts
 BILL NELSON, Florida
 BERYL ANTHONY, Jr., Arkansas
 STAN LUNDINE, New York
 ALLEN E. ERTEL, Pennsylvania
 KENT HANCE, Texas

JOHN W. WYDLER, New York
 LARRY WINN, Jr., Kansas
 BARRY M. GOLDWATER, Jr., California
 HAMILTON FISH, Jr., New York
 MANUEL LUJAN, Jr., New Mexico
 HAROLD C. HOLLENBECK, New Jersey
 ROBERT K. DORNAN, California
 ROBERT S. WALKER, Pennsylvania
 EDWIN B. FORSYTHE, New Jersey
 KEN KRAMER, Colorado
 WILLIAM CARNEY, New York
 ROBERT W. DAVIS, Michigan
 TOBY ROTH, Wisconsin
 DON RITTER, Pennsylvania
 BILL ROYER, California

*Serving on the Committee on the Budget, 96th Congress.

COMMITTEE ON SCIENCE AND TECHNOLOGY

95TH CONGRESS, 1977-1978

OLIN E. TEAGUE, Texas, *Chairman*

DON FUQUA, Florida,
 WALTER FLOWERS, Alabama
 ROBERT A. ROE, New Jersey
 MIKE McCORMACK, Washington
 GEORGE E. BROWN, Jr., California
 DALE MILFORD, Texas
 RAY THORNTON, Arkansas
 JAMES, H. SCHEUER, New York
 RICHARD L. OTTINGER, New York
 TOM HARKIN, Iowa
 JIM LLOYD, California
 JEROME A. AMBRO, New York
 ROBERT (BOB) KRUEGER, Texas
 MARILYN LLOYD BOUQUARD, Tennessee
 JAMES J. BLANCHARD, Michigan
 TIMOTHY E. WIRTH, Colorado
 STEPHEN L. NEAL, North Carolina
 THOMAS J. DOWNEY, New York
 DOUG WALGREN, Pennsylvania
 RONNIE G. FLIPPO, Alabama
 DAN GLICKMAN, Kansas
 BOB GAMMAGE, Texas
 ANTHONY C. BEILENSEN, California
 ALBERT GORE, Jr., Tennessee
 WES WATKINS, Oklahoma
 RICHARD A. TONRY, Louisiana*
 ROBERT A. YOUNG, Missouri

JOHN W. WYDLER, New York
 LARRY WINN, Jr., Kansas
 LOUIS FREY, Jr., Florida
 BARRY M. GOLDWATER, Jr., California
 GARY A. MYERS, Pennsylvania
 HAMILTON FISH, Jr., New York
 MANUEL LUJAN, Jr., New Mexico
 CARL D. PURSELL, Michigan
 HAROLD C. HOLLENBECK, New Jersey
 ELDON RUDD, Arizona
 ROBERT K. DORNAN, California
 ROBERT S. WALKER, Pennsylvania
 EDWIN B. FORSYTHE, New Jersey

*Resigned from U.S. House of Representatives May 4, 1977.

COMMITTEE ON SCIENCE AND TECHNOLOGY

94TH CONGRESS, 1975-1976

OLIN E. TEAGUE, Texas, *Chairman*

KEN HECHLER, West Virginia
 THOMAS N. DOWNING, Virginia
 DON FUQUA, Florida
 JAMES W. SYMINGTON, Missouri
 WALTER FLOWERS, Alabama
 ROBERT A. ROE, New Jersey
 MIKE McCORMACK, Washington
 BOB BERGLAND, Minnesota^{*}
 GEORGE E. BROWN, Jr., California
 DALE MILFORD, Texas
 RAY THORNTON, Arkansas
 JAMES H. SCHEUER, New York
 RICHARD L. OTTINGER, New York
 HENRY A. WAXMAN, California
 PHILIP H. HAYES, Indiana
 TOM HARKIN, Iowa
 JIM LLOYD, California
 JEROME A. AMBRO, New York
 CHRISTOPHER J. DODD, Connecticut
 MICHAEL T. BLOUIN, Iowa
 TIM L. HALL, Illinois
 ROBERT (BOB) KRUEGER, Texas
 MARILYN LLOYD, Tennessee
 JAMES J. BLANCHARD, Michigan
 TIMOTHY E. WIRTH, Colorado

CHARLES A. MOSHER, Ohio
 ALPHONZO BELL, California
 JOHN JARMAN, Oklahoma
 JOHN W. WYDLER, New York
 LARRY WINN, Jr., Kansas
 LOUIS FREY, Jr., Florida
 BARRY M. GOLDWATER, Jr., California
 MARVIN L. ESCH, Michigan
 JOHN B. CONLAN, Arizona
 WILLIAM M. KETCHUM, California^{**}
 GARY A. MYERS, Pennsylvania
 DAVID F. EMERY, Maine
 LARRY PRESSLER, South Dakota

^{*}Resigned from Committee on February 19, 1975.

^{**}Resigned from Committee on March 24, 1975.

COMMITTEE ON SCIENCE AND ASTRONAUTICS

93RD CONGRESS, 1973-1974

OLIN E. TEAGUE, Texas, *Chairman*

KEN HECHLER, West Virginia
 JOHN W. DAVIS, Georgia
 THOMAS N. DOWNING, Virginia
 DON FUQUA, Florida
 JAMES W. SYMINGTON, Missouri
 RICHARD T. HANNA, California
 WALTER FLOWERS, Alabama
 ROBERT A. ROE, New Jersey
 WILLIAM R. COTTER, Connecticut
 MIKE McCORMACK, Washington
 BOB BERGLAND, Minnesota
 J.J. PICKLE, Texas
 GEORGE E. BROWN, Jr., California
 DALE MILFORD, Texas
 RAY THORNTON, Arkansas
 BILL GUNTER, Florida

CHARLES A. MOSHER, Ohio
 ALPHONZO BELL, California
 JOHN W. WYDLER, New York
 LARRY WINN, Jr., Kansas
 LOUIS FREY, Jr., Florida
 BARRY M. GOLDWATER, Jr., California
 MARVIN L. ESCH, Michigan
 LAWRENCE COUGHLIN, Pennsylvania*
 JOHN N. HAPPY CAMP, Oklahoma
 JOHN B. CONLAN, Arizona
 STANFORD E. PARRIS, Virginia
 PAUL W. CRONIN, Massachusetts
 JAMES G. MARTIN, North Carolina
 WILLIAM M. KETCHUM, California

*Resigned from Committee on March 7, 1973.

COMMITTEE ON SCIENCE AND ASTRONAUTICS

92ND CONGRESS, 1971-1972

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas
 JOSEPH E. KARTH, Minnesota**
 KEN HECHLER, West Virginia
 JOHN W. DAVIS, Georgia
 THOMAS N. DOWNING, Virginia
 DON FUQUA, Florida
 EARLE CABELL, Texas
 JAMES W. SYMINGTON, Missouri
 RICHARD T. HANNA, California
 WALTER FLOWERS, Alabama
 ROBERT A. ROE, New Jersey
 JOHN F. SEIBERLING, Jr., Ohio
 WILLIAM R. COTTER, Connecticut
 CHARLES B. RANGEL, New York
 MORGAN F. MURPHY, Illinois
 MIKE McCORMACK, Washington
 MENDEL J. DAVIS, South Carolina
 BOB BERGLAND, Minnesota

JAMES G. FULTON, Pennsylvania*
 CHARLES A. MOSHER, Ohio
 ALPHONZO BELL, California
 THOMAS M. PELLY, Washington
 JOHN W. WYDLER, New York
 LARRY WINN, Jr., Kansas
 ROBERT PRICE, Texas
 LOUIS FREY, Jr., Florida
 BARRY M. GOLDWATER, Jr., California
 MARVIN L. ESCH, Michigan
 R. LAWRENCE COUGHLIN, Pennsylvania
 JOHN N. HAPPY CAMP, Oklahoma

*Died October 6, 1971.

**Resigned from Committee on October 6, 1971.

COMMITTEE ON SCIENCE AND ASTRONAUTICS

91ST CONGRESS, 1969-1970

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas
 JOSEPH E. KARTH, Minnesota
 KEN HECHLER, West Virginia
 EMILIO Q. DADDARIO, Connecticut
 JOHN W. DAVIS, Georgia
 THOMAS N. DOWNING, Virginia
 JOE D. WAGGONER, Jr., Louisiana
 DON FUQUA, Florida
 GEORGE E. BROWN, Jr., California
 EARLE CABELL, Texas
 BERTRAM L. PODELL, New York***
 WAYNE N. ASPINALL, Colorado
 ROY A. TAYLOR, North Carolina
 HENRY HELSTOSKI, New Jersey
 MARIO BIAGGI, New York
 JAMES W. SYMINGTON, Missouri
 EDWARD I. KOCH, New York

JAMES G. FULTON, Pennsylvania
 CHARLES A. MOSHER, Ohio
 RICHARD L. ROUDEBUSH, Indiana
 ALPHONZO BELL, California
 THOMAS M. PELLY, Washington
 DONALD RUMSFELD, Illinois*
 JOHN W. WYDLER, New York
 GUY VANDER JAGT, Michigan
 LARRY WINN, Jr., Kansas
 JERRY L. PETTIS, California**
 D.E. (BUZ) LUKENS, Ohio
 ROBERT PRICE, Texas
 LOWELL P. WEICKER, Jr., Connecticut
 LOUIS FREY, Jr., Florida
 BARRY M. GOLDWATER, Jr., California

*Resigned from House of Representatives May 26, 1969.

**Resigned from Committee on April 30, 1970.

***Resigned from Committee on December 8, 1970.

COMMITTEE ON SCIENCE AND ASTRONAUTICS

90TH CONGRESS, 1967-1968

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas
 JOSEPH E. KARTH, Minnesota
 KEN HECHLER, West Virginia
 EMILIO Q. DADDARIO, Connecticut
 J. EDWARD ROUSH, Indiana
 JOHN W. DAVIS, Georgia
 THOMAS N. DOWNING, Virginia
 JOE D. WAGGONER, Jr., Louisiana
 DON FUQUA, Florida
 GEORGE E. BROWN, Jr., California
 EARLE CABELL, Texas
 JACK BRINKLEY, Georgia
 BOB ECKHARDT, Texas
 ROBERT O. TIERNAN, Rhode Island
 BERTRAM L. PODELL, New York

JAMES G. FULTON, Pennsylvania
 CHARLES A. MOSHER, Ohio
 RICHARD L. ROUDEBUSH, Indiana
 ALPHONZO BELL, California
 THOMAS M. PELLY, Washington
 DONALD RUMSFELD, Illinois*
 EDWARD J. GURNEY, Florida
 JOHN W. WYDLER, New York
 GUY VANDER JAGT, Michigan
 LARRY WINN, Jr., Kansas
 JERRY L. PETTIS, California**
 D.E. (BUZ) LUKENS, Ohio
 JOHN E. HUNT, New Jersey

COMMITTEE ON SCIENCE AND ASTRONAUTICS

89TH CONGRESS 1965-1966

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas	JOSEPH W. MARTIN, Jr., Massachusetts
JOSEPH E. KARTH, Minnesota	JAMES G. FULTON, Pennsylvania
KEN HECHLER, West Virginia	CHARLES A. MOSHER, Ohio
EMILIO Q. DADDARIO, Connecticut	RICHARD L. ROUDEBUSH, Indiana
J. EDWARD ROUSH, Indiana	ALPHONZO BELL, California
JOHN W. DAVIS, Georgia	THOMAS M. PELLY, Washington
WILLIAM F. RYAN, New York	DONALD RUMSFELD, Illinois
THOMAS N. DOWNING, Virginia	EDWARD J. GURNEY, Florida
JOE D. WAGGONER, Jr., Louisiana	JOHN W. WYDLER, New York
DON FUQUA, Florida	BARBER B. CONABLE, Jr., New York
CARL ALBERT, Oklahoma	
ROY A. TAYLOR, North Carolina	
GEORGE E. BROWN, Jr., California	
WALTER H. MOELLER, Ohio	
LESTER L. WOLFF, New York	
WESTON E. VIVIAN, Michigan	
GALE SCHISLER, Illinois	
WILLIAM J. GREEN, Pennsylvania	
EARLE CABELL, Texas	

COMMITTEE ON SCIENCE AND ASTRONAUTICS

88TH CONGRESS 1963-1964

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas	JOSEPH W. MARTIN, Jr., Massachusetts
JOSEPH E. KARTH, Minnesota	JAMES G. FULTON, Pennsylvania
KEN HECHLER, West Virginia	J. EDGAR CHENOWETH, Colorado
EMILIO Q. DADDARIO, Connecticut	WILLIAM K. VAN PELT, Wisconsin
J. EDWARD ROUSH, Indiana	R. WALTER RIEHLMAN, New York
THOMAS G. MORRIS, New Mexico	CHARLES A. MOSHER, Ohio
BOB CASEY, Texas	RICHARD L. ROUDEBUSH, Indiana
WILLIAM J. RANDALL, Missouri	ALPHONZO BELL, California
JOHN W. DAVIS, Georgia	THOMAS M. PELLY, Washington
WILLIAM F. RYAN, New York	DONALD RUMSFELD, Illinois
THOMAS N. DOWNING, Virginia	JAMES D. WEAVER, Pennsylvania
JOE D. WAGGONER, Jr., Louisiana	EDWARD J. GURNEY, Florida
EDWARD J. PATTEN, New Jersey	JOHN W. WYDLER, New York
RICHARD H. FULTON, Tennessee	
DON FUQUA, Florida	
NEIL STAEBLER, Michigan	
CARL ALBERT, Oklahoma	

COMMITTEE ON SCIENCE AND ASTRONAUTICS

87TH CONGRESS, 1961-1962

GEORGE P. MILLER, California, *Chairman*

OLIN E. TEAGUE, Texas
 VICTOR L. ANFUSO, New York
 JOSEPH E. KARTH, Minnesota
 KEN HECHLER, West Virginia
 EMILIO Q. DADDARIO, Connecticut
 WALTER H. MOELLER, Ohio
 DAVID S. KING, Utah
 J. EDWARD ROUSH, Indiana
 THOMAS G. MORRIS, New Mexico
 BOB CASEY, Texas
 WILLIAM J. RANDALL, Missouri
 JOHN W. DAVIS, Georgia
 WILLIAM F. RYAN, New York
 JAMES C. CORMAN, California
 THOMAS N. DOWNING, Virginia
 JOE D. WAGGONER, Jr., Louisiana
 CORINNE B. RILEY, South Carolina

JOSEPH W. MARTIN, Jr., Massachusetts
 JAMES G. FULTON, Pennsylvania
 J. EDGAR CHENOWETH, Colorado
 WILLIAM K. VAN PELT, Wisconsin
 PERKINS BASS, New Hampshire
 R. WALTER RIEHLMAN, New York
 JESSICA McC. WEIS, New York
 CHARLES A. MOSHER, Ohio
 RICHARD L. ROUDEBUSH, Indiana
 ALPHONZO BELL, California
 THOMAS M. PELLY, Washington

COMMITTEE ON SCIENCE AND ASTRONAUTICS

86TH CONGRESS, 1960-1961

OVERTON BROOKS, Louisiana, *Chairman*

JOHN W. McCORMACK, Massachusetts
 GEORGE P. MILLER, California
 OLIN E. TEAGUE, Texas
 VICTOR L. ANFUSO, New York
 B.F. SISK, California
 ERWIN MITCHELL, Georgia
 JAMES M. QUIGLEY, Pennsylvania
 DAVID M. HALL, North Carolina
 LEONARD G. WOLF, Iowa
 JOSEPH E. KARTH, Minnesota
 KEN HECHLER, West Virginia
 EMILIO Q. DADDARIO, Connecticut
 WALTER H. MOELLER, Ohio
 DAVID S. KING, Utah
 J. EDWARD ROUSH, Indiana

JOSEPH W. MARTIN, Jr., Massachusetts
 JAMES G. FULTON, Pennsylvania
 GORDON L. McDONOUGH, California
 J. EDGAR CHENOWETH, Colorado
 FRANK C. OSMERS, Jr., New Jersey
 WILLIAM K. VAN PELT, Wisconsin
 A.D. BAUMHART, Jr., Ohio
 PERKINS BASS, New Hampshire
 R. WALTER RIEHLMAN, New York

SELECT COMMITTEE ON SCIENCE AND ASTRONAUTICS

85TH CONGRESS, 1958-1959

JOHN W. McCORMACK, Massachusetts, *Chairman*

OVERTON BROOKS, Louisiana

BROOKS HAYS, Arkansas

LEO W. O'BRIEN, New York

LEE METCALF, Montana

WILLIAM H. NATCHER, Kentucky

B.F. SISK, California

JOSEPH W. MARTIN, Jr., Massachusetts

LESLIE C. ARENDS, Illinois

GORDON L. McDONOUGH, California

JAMES G. FULTON, Pennsylvania

KENNETH B. KEATING, New York

GERALD R. FORD, Michigan

PUBLIC LAWS (100TH CONGRESS), WHICH WERE AVAILABLE AT THE
TIME OF PUBLICATION

PUBLIC LAW 100-107—AUG. 20, 1987

MALCOLM BALDRIGE NATIONAL QUALITY
IMPROVEMENT ACT OF 1987

101 STAT. 724

PUBLIC LAW 100-107—AUG. 20, 1987

Public Law 100-107
100th Congress

An Act

Aug. 20, 1987
(H.R. 812)

Malcolm
Baldrige
National Quality
Improvement
Act of 1987.
Decorations,
medals, awards.
15 USC 3701
note.
15 USC 3711a
note.

To amend the Stevenson-Wydler Technology Innovation Act of 1980 to establish the Malcolm Baldrige National Quality Award, with the objective of encouraging American business and other organizations to practice effective quality control in the provision of their goods and services.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Malcolm Baldrige National Quality Improvement Act of 1987".

SEC. 2. FINDINGS AND PURPOSES.

(a) FINDINGS.—The Congress finds and declares that—

(1) the leadership of the United States in product and process quality has been challenged strongly (and sometimes successfully) by foreign competition, and our Nation's productivity growth has improved less than our competitors over the last two decades;

(2) American business and industry are beginning to understand that poor quality costs companies as much as 20 percent of sales revenues nationally, and that improved quality of goods and services goes hand in hand with improved productivity, lower costs, and increased profitability;

(3) strategic planning for quality and quality improvement programs, through a commitment to excellence in manufacturing and services, are becoming more and more essential to the well-being of our Nation's economy and our ability to compete effectively in the global marketplace;

(4) improved management understanding of the factory floor, worker involvement in quality, and greater emphasis on statistical process control can lead to dramatic improvements in the cost and quality of manufactured products;

(5) the concept of quality improvement is directly applicable to small companies as well as large, to service industries as well as manufacturing, and to the public sector as well as private enterprise;

(6) in order to be successful, quality improvement programs must be management-led and customer-oriented and this may require fundamental changes in the way companies and agencies do business;

(7) several major industrial nations have successfully coupled rigorous private sector quality audits with national awards giving special recognition to those enterprises the audits identify as the very best; and

(8) a national quality award program of this kind in the United States would help improve quality and productivity by—

(A) helping to stimulate American companies to improve quality and productivity for the pride of recognition while obtaining a competitive edge through increased profits,

(B) recognizing the achievements of those companies which improve the quality of their goods and services and providing an example to others,

(C) establishing guidelines and criteria that can be used by business, industrial, governmental, and other organizations in evaluating their own quality improvement efforts, and

(D) providing specific guidance for other American organizations that wish to learn how to manage for high quality by making available detailed information on how winning organizations were able to change their cultures and achieve eminence.

(b) **PURPOSE.**—It is the purpose of this Act to provide for the establishment and conduct of a national quality improvement program under which (1) awards are given to selected companies and other organizations in the United States that practice effective quality management and as a result make significant improvements in the quality of their goods and services, and (2) information is disseminated about the successful strategies and programs.

SEC. 3. ESTABLISHMENT OF THE MALCOLM BALDRIGE NATIONAL QUALITY AWARD PROGRAM.

(a) **IN GENERAL.**—The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended by redesignating sections 16, 17, and 18 as sections 17, 18, and 19, respectively, and by inserting after section 15 the following new section:

15 USC
3712-3714.

“SEC. 16. MALCOLM BALDRIGE NATIONAL QUALITY AWARD.

15 USC 3711a.

“(a) **ESTABLISHMENT.**—There is hereby established the Malcolm Baldrige National Quality Award, which shall be evidenced by a medal bearing the inscriptions ‘Malcolm Baldrige National Quality Award’ and ‘The Quest for Excellence’. The medal shall be of such design and materials and bear such additional inscriptions as the Secretary may prescribe.

“(b) **MAKING AND PRESENTATION OF AWARD.**—(1) The President (on the basis of recommendations received from the Secretary), or the Secretary, shall periodically make the award to companies and other organizations which in the judgment of the President or the Secretary have substantially benefited the economic or social well-being of the United States through improvements in the quality of their goods or services resulting from the effective practice of quality management, and which as a consequence are deserving of special recognition.

President of U.S.

“(2) The presentation of the award shall be made by the President or the Secretary with such ceremonies as the President or the Secretary may deem proper.

President of U.S.

“(3) An organization to which an award is made under this section, and which agrees to help other American organizations improve their quality management, may publicize its receipt of such award and use the award in its advertising, but it shall be ineligible to receive another such award in the same category for a period of 5 years.

"(c) CATEGORIES IN WHICH AWARD MAY BE GIVEN.—(1) Subject to paragraph (2), separate awards shall be made to qualifying organizations in each of the following categories—

"(A) Small businesses.

"(B) Companies or their subsidiaries.

"(C) Companies which primarily provide services.

"(2) The Secretary may at any time expand, subdivide, or otherwise modify the list of categories within which awards may be made as initially in effect under paragraph (1), and may establish separate awards for other organizations including units of government, upon a determination that the objectives of this section would be better served thereby; except that any such expansion, subdivision, modification, or establishment shall not be effective unless and until the Secretary has submitted a detailed description thereof to the Congress and a period of 30 days has elapsed since that submission.

"(3) Not more than two awards may be made within any subcategory in any year (and no award shall be made within any category or subcategory if there are no qualifying enterprises in that category or subcategory).

"(d) CRITERIA FOR QUALIFICATION.—(1) An organization may qualify for an award under this section only if it—

"(A) applies to the Director of the National Bureau of Standards in writing, for the award,

"(B) permits a rigorous evaluation of the way in which its business and other operations have contributed to improvements in the quality of goods and services, and

"(C) meets such requirements and specifications as the Secretary, after receiving recommendations from the Board of Overseers established under paragraph (2)(B) and the Director of the National Bureau of Standards, determines to be appropriate to achieve the objectives of this section.

In applying the provisions of subparagraph (C) with respect to any organization, the Director of the National Bureau of Standards shall rely upon an intensive evaluation by a competent board of examiners which shall review the evidence submitted by the organization and, through a site visit, verify the accuracy of the quality improvements claimed. The examination should encompass all aspects of the organization's current practice of quality management, as well as the organization's provision for quality management in its future goals. The award shall be given only to organizations which have made outstanding improvements in the quality of their goods or services (or both) and which demonstrate effective quality management through the training and involvement of all levels of personnel in quality improvement.

"(2)(A) The Director of the National Bureau of Standards shall, under appropriate contractual arrangements, carry out the Director's responsibilities under subparagraphs (A) and (B) of paragraph (1) through one or more broad-based nonprofit entities which are leaders in the field of quality management and which have a history of service to society.

"(B) The Secretary shall appoint a board of overseers for the award, consisting of at least five persons selected for their preeminence in the field of quality management. This board shall meet annually to review the work of the contractor or contractors and make such suggestions for the improvement of the award process as they deem necessary. The board shall report the results of the award activities to the Director of the National Bureau of Standards each

year, along with its recommendations for improvement of the process.

"(e) **INFORMATION AND TECHNOLOGY TRANSFER PROGRAM.**—The Director of the National Bureau of Standards shall ensure that all program participants receive the complete results of their audits as well as detailed explanations of all suggestions for improvements. The Director shall also provide information about the awards and the successful quality improvement strategies and programs of the award-winning participants to all participants and other appropriate groups.

"(f) **FUNDING.**—The Secretary is authorized to seek and accept gifts from public and private sources to carry out the program under this section. If additional sums are needed to cover the full cost of the program, the Secretary shall impose fees upon the organizations applying for the award in amounts sufficient to provide such additional sums.

Gifts and
property.

"(g) **REPORT.**—The Secretary shall prepare and submit to the President and the Congress, within 3 years after the date of the enactment of this section, a report on the progress, findings, and conclusions of activities conducted pursuant to this section along with recommendations for possible modifications thereof."

(b) **CONFORMING AMENDMENT.**—Section 9(d) of such Act (15 U.S.C. 3708(d)) is amended by striking "or 16" and inserting in lieu thereof "16, or 17".

Approved August 20, 1987.

LEGISLATIVE HISTORY—H.R. 812:

HOUSE REPORTS: No. 100-96 (Comm. on Science, Space, and Technology).

SENATE REPORTS: No. 100-143 (Comm. on Commerce, Science, and Transportation).

CONGRESSIONAL RECORD, Vol. 133 (1987):

June 8, considered and passed House.

Aug. 5, considered and passed Senate, amended.

Aug. 7, House concurred in Senate amendments.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 23 (1987):

Aug. 20, Presidential statement.

PUBLIC LAW 100-147—OCT. 30, 1987

**NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION AUTHORIZATION
ACT OF 1988**

101 STAT. 860

PUBLIC LAW 100-147—OCT. 30, 1987

Public Law 100-147
100th Congress

An Act

Oct. 30, 1987
[H.R. 2782]

National
Aeronautics and
Space
Administration
Authorization
Act of 1988.

To authorize appropriations to the National Aeronautics and Space Administration for research and development; space flight, control and data communications; construction of facilities; and research and program management; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Aeronautics and Space Administration Authorization Act of 1988".

TITLE I—AUTHORIZATION OF APPROPRIATIONS FOR THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SEC. 101. (a) There is authorized to be appropriated to the National Aeronautics and Space Administration to become available October 1, 1987, for "Research and development", for the following programs:

- (1) Permanently manned space station, \$767,000,000.
- (2) Space transportation capability development, \$553,600,000.
- (3) Physics and astronomy, \$581,800,000.
- (4) Life sciences, \$74,600,000.
- (5) Planetary exploration, \$320,300,000, of which \$42,300,000 is authorized only for the purpose of preparing the Mars Observer Spacecraft for launch in 1992 and for procuring spare parts for a Planetary Observer program.
- (6) Space applications, \$651,400,000, of which \$84,000,000 is authorized only for the Advanced Communications Technology Satellite.
- (7) Technology utilization, \$18,300,000.
- (8) Commercial use of space, \$30,700,000.
- (9) Aeronautical research and technology, \$387,000,000.
- (10) Transatmospheric research and technology, \$66,000,000.
- (11) Space research and technology, \$234,000,000.
- (12) Safety, reliability, and quality assurance, \$16,200,000.
- (13) Tracking and data advanced systems, \$18,100,000.

(b) There is authorized to be appropriated to the National Aeronautics and Space Administration to become available October 1, 1987, for "Space flight, control and data communications", for the following programs:

- (1) Space shuttle production and operational capability, \$1,174,600,000, of which \$76,000,000 is authorized only for initial lay-in spare parts for the space shuttle orbiter.
- (2) Space transportation operations, \$1,885,800,000, of which \$106,700,000 is authorized only for flight spare parts for the space shuttle orbiter.
- (3) Space and ground network, communications, and data systems, \$924,900,000.
- (4) Expendable launch vehicle operations, \$60,000,000.

(c) There is authorized to be appropriated to the National Aeronautics and Space Administration to become available October 1, 1987, for "Construction of facilities", including land acquisition, as follows:

- (1) Construction of LC 39 Operations Support Building, Kennedy Space Center, \$22,800,000.
- (2) Construction of Spacecraft Systems Development and Integration Facility, Goddard Space Flight Center, \$8,600,000.
- (3) Modifications for utility reliability, Goddard Space Flight Center, \$2,900,000.
- (4) Construction of Integrated Test Facility, Dryden Flight Research Facility, \$10,500,000.
- (5) Modifications to Hypersonic Propulsion Facility for Vacuum Systems, Langley Research Center, \$3,100,000.
- (6) Construction of addition to the Research Analysis Center, Lewis Research Center, \$9,800,000.
- (7) Modifications for Fan/Compressor Research, Engine Research Building, Lewis Research Center, \$6,500,000.
- (8) Construction of Communications Development Antenna, Goldstone, California, Jet Propulsion Laboratories, \$6,400,000.
- (9) Repair of facilities at various locations, not in excess of \$750,000 per project, \$25,000,000.
- (10) Rehabilitation and modification of facilities at various locations, not in excess of \$750,000 per project, \$32,000,000.
- (11) Minor construction of new facilities and additions to existing facilities at various locations, not in excess of \$500,000 per project, \$8,000,000.
- (12) Environmental compliance and restoration, \$23,900,000.
- (13) Repair and modernization of the 12-foot pressure wind tunnel at the Ames Research Center, \$41,000,000.
- (14) Facility planning and design not otherwise provided for, \$16,000,000.

(d) There is authorized to be appropriated to the National Aeronautics and Space Administration to become available October 1, 1987, for "Research and program management", \$1,583,000,000.

(e) The Administrator is authorized (to the extent provided in an appropriation Act) to transfer \$22,000,000 from any funds which were made available for prior years, and which remain unobligated as of the date of the enactment of this Act, except for funds made available for Aeronautical and Space Research and Technology, Transatmospheric Research and Technology programs, Construction of Facilities activities, and Research and Program Management activities for the support of such programs, and use such funds for the preparation of the Mars Observer spacecraft for launch in 1992.

(f) Notwithstanding the provisions of subsection (h), appropriations authorized in this Act for "Research and development" and "Space flight, control and data communications" may be used for (1) any items of a capital nature (other than acquisition of land) which may be required at locations other than installations of the National Aeronautics and Space Administration (hereinafter in this title referred to as the "Administration") for the performance of research and development contracts, and (2) grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities; and title to such facilities shall be vested in the United States unless the Administrator of the National Aeronautics and Space Administration (hereinafter in

this title referred to as the "Administrator") determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Each such grant shall be made under such conditions as the Administrator shall determine to be required to ensure that the United States will receive therefrom benefit adequate to justify the making of that grant. None of the funds appropriated for "Research and development" and "Space flight, control and data communications" pursuant to this Act may be used in accordance with this subsection for the construction of any major facility, the estimated cost of which, including collateral equipment, exceeds \$500,000, unless the Administrator or the Administrator's designee has notified the President of the Senate and the Speaker of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives of the nature, location, and estimated cost of such facility.

42 USC 2459a.

(g) When so specified and to the extent provided in an appropriation Act, (1) any amount appropriated for "Research and development", for "Space flight, control and data communications", or for "Construction of facilities" may remain available without fiscal year limitation, and (2) maintenance and operation of facilities and support services contracts may be entered into under the "Research and program management" appropriation for periods not in excess of 12 months beginning at any time during the fiscal year.

(h) Appropriations made pursuant to subsection (d) may be used, but not to exceed \$35,000, for scientific consultations or extraordinary expenses upon the approval or authority of the Administrator, and the Administrator's determination shall be final and conclusive upon the accounting officers of the Government.

(i) Of the funds appropriated pursuant to subsections (a), (b), and (d), not in excess of \$100,000 for each project, including collateral equipment, may be used for construction of new facilities and additions to existing facilities, and for repair, rehabilitation, or modification of facilities: *Provided*, That, of the funds appropriated pursuant to subsection (a) or (b), not in excess of \$500,000 for each project, including collateral equipment, may be used for any of the foregoing for unforeseen programmatic needs: *Provided further*, That, of the funds appropriated pursuant to subsection (d), not in excess of \$500,000 per project, including collateral equipment, may be used for repair, rehabilitation, or modification of facilities controlled by the General Services Administration.

Sec. 102. Authorization is granted whereby any of the amounts prescribed in paragraphs (1) through (13) of section 101(c) of this title—

(1) in the discretion of the Administrator or the Administrator's designee, may be varied upward 10 percent; or

(2) following a report by the Administrator or the Administrator's designee to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives on the circumstances of such action, may be varied upward 25 percent; to meet unusual cost variations, but the total cost of all work authorized under such paragraphs shall not exceed the total of the amounts specified in such paragraphs.

Sec. 103. Not to exceed one-half of 1 percent of the funds appropriated pursuant to section 101 (a) or (b) of this title may be

Reports.

transferred to and merged with the "Construction of facilities" appropriation, and when so transferred, together with \$10,000,000 of funds appropriated pursuant to section 101(c) of this title (other than funds appropriated pursuant to paragraph (14) of such section) shall be available for expenditure to construct, expand, and modify laboratories and other installations at any location (including locations specified in section 101(c)), if (1) the Administrator determines that such action is necessary because of changes in the national program of aeronautical and space activities or new scientific or engineering developments, and (2) the Administrator determines that deferral of such action until the enactment of the next authorization Act would be inconsistent with the interest of the Nation in aeronautical and space activities. The funds so made available may be expended to acquire, construct, convert, rehabilitate, or install permanent or temporary public works, including land acquisition, site preparation, appurtenances, utilities, and equipment. No portion of such sums may be obligated for expenditure or expended to construct, expand, or modify laboratories and other installations unless a period of 30 days has passed after the Administrator or the Administrator's designee has transmitted to the President of the Senate and to the Speaker of the House of Representatives and to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a written report containing a full and complete statement concerning (A) the nature of such construction, expansion, or modification, (B) the cost thereof including the cost of any real estate action pertaining thereto, and (C) the reason why such construction, expansion, or modification is necessary in the national interest.

Reports.

Sec. 104. Notwithstanding any other provision of this title, no amount appropriated pursuant to this title may be used for any program—

- (1) deleted by the Congress from requests as originally made either to the Committee on Commerce, Science, and Transportation of the Senate or the Committee on Science, Space, and Technology of the House of Representatives;
- (2) in excess of the amount actually authorized for that particular program by section 102 (a), (b), and (d); and
- (3) which has not been presented to either such Committee; unless a period of 30 days has passed after the receipt by the President of the Senate and the Speaker of the House of Representatives and each such committee of notice given by the Administrator or the Administrator's designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action.

Sec. 105. No civil space station authorized under section 101(a)(1) of this title may be used to carry or place in orbit any nuclear weapon or any other weapon of mass destruction, to install any such weapon on any celestial body, or to station any such weapon in space in any other manner. This civil space station may be used only for peaceful purposes.

Sec. 106. (a) The Administrator is directed to undertake the construction of a permanently manned space station (hereinafter referred to as the "space station") to become operational in 1995. The space station will be used for the following purposes—

- (1) the conduct of scientific experiments, applications experiments, and engineering experiments;

42 USC 2451
note.

(2) the servicing, rehabilitation, and construction of satellites and space vehicles;

(3) the development and demonstration of commercial products and processes; and

(4) the establishment of a space base for other civilian and commercial space activities.

(b) The space station shall be developed and operated in a manner that supports other science and space activities.

(c) In order to reduce the cost of operations of the space station and its ground support system, the Administrator shall undertake the development of such advanced technologies as may be appropriate within the level of funding authorized in this Act.

(d) The Administrator shall seek to have portions of the space station constructed and operated by the private sector, where appropriate.

(e) The Administrator shall promote international cooperation in the space station program by undertaking the development, construction, and operation of the space station in conjunction with (but not limited to) the Governments of Europe, Japan, and Canada.

(f) The space station shall be designed, developed, and operated in a manner that enables evolutionary enhancement.

SEC. 107. (a) For each of the fiscal years 1989 through 1996, the Administrator, along with the President's submission to the Congress of the annual budget request for the National Aeronautics and Space Administration, shall submit a capital development plan for the space station program. Each such plan shall include the estimated cost of all direct research and development; space flight, control and data communications; construction of facilities; and research and program management for the fiscal year involved and the two succeeding fiscal years.

(b) For fiscal year 1989, the capital development plan shall also include a statement outlining the total cost, schedule, and configuration of the Administration's space station proposal, as well as an analysis of the "Report of the Committee on the Space Station of the National Research Council". Such analysis shall examine alternatives for the configuration of the space station including but not limited to low cost alternatives.

SEC. 108. In order to ensure that the development of the space station is part of a balanced civilian space program, the Administrator is instructed to establish as a goal a funding profile that limits (1) space station total annual costs under the capital development plan in section 107 to 25 percent of the total budget request for the National Aeronautics and Space Administration and (2) all space station direct operations costs, except for those costs associated with the utilization of the space station, to 10 percent of the total budget request for the National Aeronautics and Space Administration.

SEC. 109. (a) It is the sense of the Congress that the launching and servicing of the space station should be accomplished by the most cost-effective use of space transportation systems, including the space shuttle and expendable launch vehicles.

(b) Not later than January 15, 1988, the Administrator shall submit a preliminary report on the cost-effective use of space transportation systems for the launch of space station elements during the development and operation of the space station. The Administrator shall consider—

International
agreements.
Canada.
Europe.
Japan.
42 USC 2451
note.

42 USC 2451
note.

42 USC 2451
note.

Reports.

(1) the potential use of future advanced or heavy lift expendable launch vehicles for purposes of the assembly and operation of the space station;

(2) the use of existing expendable launch vehicles of the National Aeronautics and Space Administration, the Department of Defense, and the Private Sector;

(3) the requirement for space shuttle launches; and

(4) the risk of capital losses from the use of expendable launch vehicles and the space shuttle.

Sec. 110. (a) The Administrator shall set and collect reasonable user fees for the use and maintenance of the space station.

42 USC 2451
note.

(b) The Administrator shall set user fees so as to—

(1) promote the use of the space station consistent with the policy set forth in section 106;

(2) recover the costs of the use of the space station, including reasonable charges for any enhancement needed for such use; and

(3) conserve and efficiently allocate the resources of the space station.

(c) The Administrator may, on a case-by-case basis, waive or modify such user fees when in the Administrator's judgment such waiver or modification will further the goals and purposes of the National Aeronautics and Space Act of 1958, including—

(1) the advancement of scientific or engineering knowledge;

(2) international cooperation; and

(3) the commercial use of space.

Sec. 111. No later than September 30, 1988, the Administrator shall submit a detailed plan for collecting reimbursements for the utilization of the space station under section 110, including the services to be offered, the methodology and bases by which prices will be charged, and the estimated revenues.

42 USC 2451
note.

Sec. 112. The Intergovernmental Agreement currently being negotiated between the United States Government and Canada, Japan, and member governments of the European Space Agency, and the Memorandum of Understanding currently being negotiated between the National Aeronautics and Space Administration and its counterpart agencies in Canada, Japan, and Europe concerning the detailed design, development, construction, operation, or utilization of the space station shall be submitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives. No such agreement shall take effect until 30 days have passed after the receipt by such committees of the agreement.

International
agreements.
Canada.
Europe.
Japan.
42 USC 2451
note.

Sec. 113. (a) It is the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible, and that the National Aeronautics and Space Administration should explore ways and means of distributing its research and development funds whenever feasible.

42 USC 2459
note.

(b) The Administrator shall report to the Congress on the extent to which such consideration has been given and such ways and means explored during fiscal year 1987, and shall submit such report to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate by January 15, 1988.

Reports.

International
agreements.

SEC. 114. (a) The Administrator shall award to a domestic firm a contract that, under the use of competitive procedures, would be awarded to a foreign firm, if—

- (1) the final product of the domestic firm will be completely assembled in the United States;
 - (2) when completely assembled, not less than 50 percent of the final product of the domestic firm will be domestically produced; and
 - (3) the difference between the bids submitted by the foreign and domestic firms is not more than 6 percent.
- (b) This section shall not apply to the extent to which—
- (1) such applicability would not be in the public interest;
 - (2) compelling national security considerations require otherwise; or
 - (3) the United States Trade Representative determines that such an award would be in violation of the General Agreement on Tariffs and Trade or an international agreement to which the United States is a party.
- (c) For purposes of this section—
- (1) the term "domestic firm" means a business entity that is incorporated in the United States and that conducts business operations in the United States; and
 - (2) the term "foreign firm" means a business entity not described in paragraph (1).
- (d) This section shall apply only to contracts for which—
- (1) amounts are made available pursuant to this Act; and
 - (2) solicitations for bids are issued after the date of the enactment of this Act.

SEC. 115. Title II of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451 et seq.) is amended by adding at the end the following:

"DONATIONS FOR SPACE SHUTTLE ORBITER

Gifts and
property.
42 USC 2476b.

"SEC. 208. (a) The Administrator may accept gifts and donations of services, money, and real, personal, tangible, and intangible property, and use such gifts and donations for the construction of a space shuttle orbiter.

"(b)(1) The authority of the Administrator to accept gifts or donations pursuant to subsection (a) of this section shall terminate five years after the date of the enactment of this section.

"(2) All gifts and donations accepted by the Administrator pursuant to subsection (a) of this section which are not needed for construction of a space shuttle orbiter shall be used by the Administrator for an appropriate purpose—

"(A) in tribute to the dedicated crew of the space shuttle Challenger; and

"(B) in furtherance of the exploration of space.

"(c) The name of a space shuttle orbiter constructed in whole or in part with gifts or donations whose acceptance and use are authorized by subsection (a) of this section shall be selected by the Administrator from among suggestions submitted by students in elementary and secondary schools."

SEC. 116. (a) It is the sense of the Congress that the space shuttle is a critical national resource that should be preserved; that it should be used primarily for those missions which require its unique capabilities; and that a diversified family of expendable launch

vehicles should be incorporated by use into the Nation's civilian space flight program.

(b) The Administrator shall establish a program for launching payloads by means of expendable launch vehicles and, if available, by commercial launch services.

(c) The Administrator shall take such action as may be necessary to ensure that expendable launch vehicles or, if available, commercial launch services are obtained for the launch of the following payloads:

(1) Roentgen Satellite (ROSAT), for launch in 1990.

(2) Tracking and Data Relay Satellite (TDRS)-F, or a planetary mission.

(3) Extreme Ultraviolet Explorer (EUVE), for launch in 1991.

(4) Mars Observer, for launch in 1992.

(d) The Administrator shall report to the Congress not later than January 15, 1988, on the Administrator's compliance with this section, and shall submit such report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives. Reports.

Sec. 117. Title III of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2451 et seq.) is amended by adding at the end the following:

"CONTRACTS REGARDING EXPENDABLE LAUNCH VEHICLES

"Sec. 311. (a) The Administrator may enter into contracts for expendable launch vehicle services that are for periods in excess of the period for which funds are otherwise available for obligation, provide for the payment for contingent liability which may accrue in excess of available appropriations in the event the Government for its convenience terminates such contracts, and provide for advance payments reasonably related to launch vehicle and related equipment, fabrication, and acquisition costs, if any such contract limits the amount of the payments that the Federal Government is allowed to make under such contract to amounts provided in advance in appropriation Acts. Such contracts may be limited to sources within the United States when the Administrator determines that such limitation is in the public interest. 42 USC 2459c.

"(b) If funds are not available to continue any such contract, the contract shall be terminated for the convenience of the Government, and the costs of such contract shall be paid from appropriations originally available for performance of the contract, from other, unobligated appropriations currently available for the procurement of launch services, or from funds appropriated for such payments."

Sec. 118. (a) It is the sense of the Congress that the capital investment in space satellites and vehicles should be enhanced and protected by establishing a system of servicing, rehabilitation, and repair capabilities in orbit (hereinafter referred to as "satellite servicing").

(b) The Administrator shall conduct a thorough and comprehensive study of satellite servicing with a view toward establishing national goals and objectives for utilizing such capabilities.

(c) In conducting the study of satellite servicing under this section, the Administrator shall give consideration to—

(1) the use of the space shuttle, the space station, and other space vehicles to carry out or support satellite servicing;

Insurance.

Reports.

(2) all potential users of satellite servicing capabilities, including civilian, defense, private, and foreign satellites and space vehicles;

(3) experience to date with in-orbit satellite servicing including the costs of such operations and the fees charged users that are not from the National Aeronautics and Space Administration;

(4) the pertinence of satellite servicing to insurance, including the character, cost, and availability of insurance;

(5) the pertinence of satellite servicing to satellite and vehicle design;

(6) the pertinence of satellite servicing to the National Aeronautics and Space Administration and other space programs, including science and applications programs; and

(7) the prices to be charged for satellite servicing such that the full costs of such servicing can be recovered.

(d) The Administrator shall complete the study and present a full report on it to the Congress on or before January 15, 1988.

SEC. 119. The Administrator shall review the findings, recommendations, and proposed space agenda of the National Commission on Space as set forth in its report submitted under section 204(c) of the National Aeronautics and Space Administration Authorization Act, 1985 (Public Law 98-361; 98 Stat. 422), and shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives, within 60 days after the date of enactment of this Act, a recommendation for a long-range implementation plan, including an impact assessment of such implementation on personnel, budget, and other resources.

SEC. 120. Section 24 of the Commercial Space Launch Act (49 U.S.C. App. 2623) is amended by adding at the end thereof the following: "There is authorized to be appropriated to the Secretary to carry out this Act \$4,548,000 for fiscal year 1988."

SEC. 121. (a) It is the sense of the Congress that the solid rocket motor project of the space shuttle program would benefit from competition, and that an advanced solid rocket motor would enhance the margin of safety, reliability, and performance of the space shuttle.

(b) By the date on which the President submits to the Congress the fiscal year 1990 budget request for the National Aeronautics and Space Administration, the Administrator shall issue a request for proposals to acquire by means of a competitive procurement an advanced solid rocket motor. The Administrator shall also consider ways and means to improve quality control, reduce operational hazards, reduce costs, increase competition, and enhance manufacturing processes, including, but not limited to, constructing a government-owned and contractor-operated solid rocket motor production facility and providing for a dual source of supply of the advanced solid rocket motor.

(c) Until a request for proposals has been issued under subsection (b) of this section, no contract for the purchase of additional solid rocket motors shall be extended or signed by the Administrator. The Administrator may proceed with the procurement of long-lead materials for the solid rocket motors from the current contractor only after the Administrator has certified to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of

Representatives that such action is necessary to prevent a delay in the space shuttle launch schedule.

(d) The Administrator shall notify the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives if the competitive procurement specified in subsection (b) cannot be conducted. The Administrator shall transmit such notice along with a complete explanation of the reasons supporting such determination. Following such determination, but no sooner than 30 days following the transmission of the notice required under this subsection, the Administrator shall—

(1) conduct a competition to select a qualified second source of supply (in addition to the current contractor) for flight sets of the redesigned solid rocket motor that is currently under development; or

(2) recompute the current source of supply for flight sets of the redesigned solid rocket motor.

(e) No later than March 31, 1988, the Administrator shall present to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a comprehensive acquisition plan for the advanced solid rocket motor in accordance with this section.

TITLE II—NATIONAL SPACE GRANT COLLEGE AND FELLOWSHIP PROGRAM

Sec. 201. This title may be cited as the "National Space Grant College and Fellowship Act".

Sec. 202. The Congress finds that—

(1) the vitality of the Nation and the quality of life of the citizens of the Nation depend increasingly on the understanding, assessment, development, and utilization of space resources;

(2) research and development of space science, space technology, and space commercialization will contribute to the quality of life, national security, and the enhancement of commerce;

(3) the understanding and development of the space frontiers require a broad commitment and an intense involvement on the part of the Federal Government in partnership with State and local governments, private industry, universities, organizations, and individuals concerned with the exploration and utilization of space;

(4) the National Aeronautics and Space Administration, through the national space grant college and fellowship program, offers the most suitable means for such commitment and involvement through the promotion of activities that will result in greater understanding, assessment, development, and utilization; and

(5) Federal support of the establishment, development, and operation of programs and projects by space grant colleges, space grant regional consortia, institutions of higher education, institutes, laboratories, and other appropriate public and private entities is the most cost-effective way to promote such activities.

Sec. 203. The purposes of this title are to—

(1) increase the understanding, assessment, development, and utilization of space resources by promoting a strong educational

National Space
Grant College
and Fellowship
Act.
Education.
Grants.
Contracts.
42 USC 2486
note.
42 USC 2486.

42 USC 2486a.

base, responsive research and training activities, and broad and prompt dissemination of knowledge and techniques;

(2) utilize the abilities and talents of the universities of the Nation to support and contribute to the exploration and development of the resources and opportunities afforded by the space environment;

(3) encourage and support the existence of interdisciplinary and multidisciplinary programs of space research within the university community of the Nation, to engage in integrated activities of training, research and public service, to have co-operative programs with industry, and to be coordinated with the overall program of the National Aeronautics and Space Administration;

(4) encourage and support the existence of consortia, made up of university and industry members, to advance the exploration and development of space resources in cases in which national objectives can be better fulfilled than through the programs of single universities;

(5) encourage and support Federal funding for graduate fellowships in fields related to space; and

(6) support activities in colleges and universities generally for the purpose of creating and operating a network of institutional programs that will enhance achievements resulting from efforts under this title.

42 USC 2486b.

SEC. 204. As used in this title, the term—

(1) "Administration" means the National Aeronautics and Space Administration;

(2) "Administrator" means the Administrator of the National Aeronautics and Space Administration;

(3) "aeronautical and space activities" has the meaning given to such term in section 103(1) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2452(1));

(4) "field related to space" means any academic discipline or field of study (including the physical, natural, and biological sciences, and engineering, space technology, education, economics, sociology, communications, planning, law, international affairs, and public administration) which is concerned with or likely to improve the understanding, assessment, development, and utilization of space;

(5) "panel" means the space grant review panel established pursuant to section 210 of this title;

(6) "person" means any individual, any public or private corporation, partnership, or other association or entity (including any space grant college, space grant regional consortium, institution of higher education, institute, or laboratory), or any State, political subdivision of a State, or agency or officer of a State or political subdivision of a State;

(7) "space environment" means the environment beyond the sensible atmosphere of the Earth;

(8) "space grant college" means any public or private institution of higher education which is designated as such by the Administrator pursuant to section 208 of this title;

(9) "space grant program" means any program which—

(A) is administered by any space grant college, space grant regional consortium, institution of higher education, institute, laboratory, or State or local agency; and

(B) includes two or more projects involving education and one or more of the following activities in the fields related to space—

- (i) research,
- (ii) training, or
- (iii) advisory services;

(10) "space grant regional consortium" means any association or other alliance which is designated as such by the Administrator pursuant to section 208 of this title;

(11) "space resource" means any tangible or intangible benefit which can only be realized from—

- (A) aeronautical and space activities; or
- (B) advancements in any field related to space; and

(12) "State" means any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, or any other territory or possession of the United States.

Sec. 205. (a) The Administrator shall establish and maintain, within the Administration, a program to be known as the national space grant college and fellowship program. The national space grant college and fellowship program shall consist of the financial assistance and other activities provided for in this title. The Administrator shall establish long-range planning guidelines and priorities, and adequately evaluate the program.

42 USC 2486c.

(b) Within the Administration, the program shall—

(1) apply the long-range planning guidelines and the priorities established by the Administrator under subsection (a) of this section;

(2) advise the Administrator with respect to the expertise and capabilities which are available through the national space grant college and fellowship program, and make such expertise available to the Administration as directed by the Administrator;

(3) evaluate activities conducted under grants and contracts awarded pursuant to sections 206 and 207 of this title to assure that the purposes set forth in section 203 of this title are implemented;

(4) encourage other Federal departments, agencies, and instrumentalities to use and take advantage of the expertise and capabilities which are available through the national space grant college and fellowship program, on a cooperative or other basis;

(5) encourage cooperation and coordination with other Federal programs concerned with the development of space resources and fields related to space;

(6) advise the Administrator on the designation of recipients supported by the national space grant college and fellowship program and, in appropriate cases, on the termination or suspension of any such designation; and

(7) encourage the formation and growth of space grant and fellowship programs.

(c) To carry out the provisions of this title, the Administrator may—

(1) accept conditional or unconditional gifts or donations of services, money, or property, real, personal or mixed, tangible or intangible;

Gifts and property.

(2) accept and use funds from other Federal departments, agencies, and instrumentalities to pay for fellowships, grants, contracts, and other transactions; and

Regulations.

(3) issue such rules and regulations as may be necessary and appropriate.

42 USC 2486d.

SEC. 206. (a) The Administrator may make grants and enter into contracts or other transactions under this subsection to assist any space grant and fellowship program or project if the Administrator finds that such program or project will carry out the purposes set forth in section 203 of this title. The total amount paid pursuant to any such grant or contract may equal 66 percent, or any lesser percent, of the total cost of the space grant and fellowship program or project involved, except that this limitation shall not apply in the case of grants or contracts paid for with funds accepted by the Administrator pursuant to section 205(c)(2) of this title.

(b) The Administrator may make special grants under this subsection to carry out the purposes set forth in section 203 of this title. The amount of any such grant may equal 100 percent, or any lesser percent, of the total cost of the project involved. No grant may be made under this subsection, unless the Administrator finds that—

(1) no reasonable means is available through which the applicant can meet the matching requirement for a grant under subsection (a) of this section;

(2) the probable benefit of such project outweighs the public interest in such matching requirement; and

(3) the same or equivalent benefit cannot be obtained through the award of a contract or grant under subsection (a) of this section or section 207 of this title.

Regulations.

(c) Any person may apply to the Administrator for a grant or contract under this section. Application shall be made in such form and manner, and with such content and other submissions, as the Administrator shall by regulation prescribe.

(d)(1) Any grant made, or contract entered into, under this section shall be subject to the limitations and provisions set forth in paragraphs (2) and (3) of this subsection and to such other terms, conditions and requirements as the Administrator considers necessary or appropriate.

(2) No payment under any grant or contract under this section may be applied to—

(A) the purchase of any land;

(B) the purchase, construction, preservation, or repair of any building; or

(C) the purchase or construction of any launch facility or launch vehicle.

(3) Notwithstanding paragraph (2) of this subsection, the items in subparagraphs (A), (B), and (C) of such paragraph may be leased upon written approval of the Administrator.

Regulations.

(4) Any person who receives or utilizes any proceeds of any grant or contract under this section shall keep such records as the Administrator shall by regulation prescribe as being necessary and appropriate to facilitate effective audit and evaluation, including records which fully disclose the amount and disposition by such recipient of such proceeds, the total cost of the program or project in connection with which such proceeds were used, and the amount, if any, of such cost which was provided through other sources. Such records shall be maintained for three years after the completion of such a program or project. The Administrator and the Comptroller

General of the United States, or any of their duly authorized representatives, shall have access, for the purpose of audit and evaluation, to any books, documents, papers and records of receipts which, in the opinion of the Administrator or the Comptroller General, may be related or pertinent to such grants and contracts.

Sec. 207. (a) The Administrator shall identify specific national needs and problems relating to space. The Administrator may make grants or enter into contracts under this section with respect to such needs or problems. The amount of any such grant or contract may equal 100 percent, or any lesser percent, of the total cost of the project involved.

42 USC 2486e.

(b) Any person may apply to the Administrator for a grant or contract under this section. In addition, the Administrator may invite applications with respect to specific national needs or problems identified under subsection (a) of this section. Application shall be made in such form and manner, and with such content and other submissions, as the Administrator shall by regulation prescribe. Any grant made, or contract entered into, under this section shall be subject to the limitations and provisions set forth in section 206(d) (2) and (4) of this title and to such other terms, conditions, and requirements as the Administrator considers necessary or appropriate.

Sec. 208. (a)(1) The Administrator may designate—

42 USC 2486f.

(A) any institution of higher education as a space grant college; and

(B) any association or other alliance of two or more persons, other than individuals, as a space grant regional consortium.

(2) No institution of higher education may be designated as a space grant college, unless the Administrator finds that such institution—

(A) is maintaining a balanced program of research, education, training, and advisory services in fields related to space;

(B) will act in accordance with such guidelines as are prescribed under subsection (b)(2) of this section; and

(C) meets such other qualifications as the Administrator considers necessary or appropriate.

(3) No association or other alliance of two or more persons may be designated as a space grant regional consortium, unless the Administrator finds that such association or alliance—

(A) is established for the purpose of sharing expertise, research, educational facilities or training facilities, and other capabilities in order to facilitate research, education, training, and advisory services, in any field related to space;

(B) will encourage and follow a regional approach to solving problems or meeting needs relating to space, in cooperation with appropriate space grant colleges, space grant programs, and other persons in the region;

(C) will act in accordance with such guidelines as are prescribed under subsection (b)(2) of this section; and

(D) meets such other qualifications as the Administrator considers necessary or appropriate.

(b) The Administrator shall by regulation prescribe—

Regulations.

(1) the qualifications required to be met under subsection (a) (2)(C) and (3)(D) of this section; and

(2) guidelines relating to the activities and responsibilities of space grant colleges and space grant regional consortia.

(c) The Administrator may, for cause and after an opportunity for hearing, suspend or terminate any designation under subsection (a) of this section.

42 USC 2486g.

SEC. 209. (a) The Administrator shall support a space grant fellowship program to provide educational and training assistance to qualified individuals at the graduate level of education in fields related to space. Such fellowships shall be awarded pursuant to guidelines established by the Administrator. Space grant fellowships shall be awarded to individuals at space grant colleges, space grant regional consortia, other colleges and institutions of higher education, professional associations, and institutes in such a manner as to assure wide geographic and institutional diversity in the pursuit of research under the fellowship program.

(b) The total amount which may be provided for grants under the space grant fellowship program during any fiscal year shall not exceed an amount equal to 50 percent of the total funds appropriated for such year pursuant to this title.

(c) Nothing in this section shall be construed to prohibit the Administrator from sponsoring any research fellowship program, including any special emphasis program, which is established under an authority other than this title.

42 USC 2486h.

SEC. 210. (a) The Administrator shall establish an independent committee known as the space grant review panel, which shall not be subject to the provisions of the Federal Advisory Committee Act (5 U.S.C. App. 1 et seq.; Public Law 92-463).

(b) The panel shall take such steps as may be necessary to review, and shall advise the Administrator with respect to—

- (1) applications or proposals for, and performance under, grants and contracts awarded pursuant to sections 206 and 207 of this title;
- (2) the space grant fellowship program;
- (3) the designation and operation of space grant colleges and space grant regional consortia, and the operation of space grant and fellowship programs;
- (4) the formulation and application of the planning guidelines and priorities pursuant to section 205 (a) and (b)(1) of this title; and
- (5) such other matters as the Administrator refers to the panel for review and advice.

(c) The Administrator shall make available to the panel any information, personnel and administrative services and assistance which is reasonable to carry out the duties of the panel.

(d)(1) The Administrator shall appoint the voting members of the panel. A majority of the voting members shall be individuals who, by reason of knowledge, experience, or training, are especially qualified in one or more of the disciplines and fields related to space. The other voting members shall be individuals who, by reason of knowledge, experience or training, are especially qualified in, or representative of, education, extension services, State government, industry, economics, planning, or any other activity related to efforts to enhance the understanding, assessment, development, or utilization of space resources. The Administrator shall consider the potential conflict of interest of any individual in making appointments to the panel.

(2) The Administrator shall select one voting member to serve as the Chairman and another voting member to serve as the Vice

Chairman. The Vice Chairman shall act as Chairman in the absence or incapacity of the Chairman.

(3) Voting members of the panel who are not Federal employees shall be reimbursed for actual and reasonable expenses incurred in the performance of such duties.

(4) The panel shall meet on a biannual basis and, at any other time, at the call of the Chairman or upon the request of a majority of the voting members or of the Administrator.

(5) The panel may exercise such powers as are reasonably necessary in order to carry out the duties enumerated in subsection (b) of this section.

SEC. 211. Each department, agency or other instrumentality of the Federal Government which is engaged in or concerned with, or which has authority over, matters relating to space— 42 USC 2486i.

(1) may, upon a written request from the Administrator, make available, on a reimbursable basis or otherwise, any personnel (with their consent and without prejudice to their position and rating), service, or facility which the Administrator considers necessary to carry out any provision of this title;

(2) may, upon a written request from the Administrator, furnish any available data or other information which the Administrator considers necessary to carry out any provision of this title; and

(3) may cooperate with the Administration.

SEC. 212. (a) The Administrator shall submit to the Congress and the President, not later than January 1, 1989, and not later than February 15 of every odd-numbered year thereafter, a report on the activities of the national space grant and fellowship program. 42 USC 2486j.

(b) The Director of the Office of Management and Budget and the Director of the Office of Science and Technology Policy in the Executive Office of the President shall have the opportunity to review each report prepared pursuant to subsection (a) of this section. Such Directors may submit, for inclusion in such report, comments and recommendations and an independent evaluation of the national space grant college and fellowship program. Such comments and recommendations shall be submitted to the Administrator not later than 90 days before such a report is submitted pursuant to subsection (a) of this section and the Administrator shall include such comments and recommendations as a separate section in such report.

SEC. 213. The Administrator shall not under this title designate any space grant college or space grant regional consortium or award any fellowship, grant, or contract unless such designation or award is made in accordance with the competitive, merit-based review process employed by the Administration on the date of enactment of this Act. 42 USC 2486k.

SEC. 214. (a) There are authorized to be appropriated for the purposes of carrying out the provisions of this title sums not to exceed— Appropriation authorization. 42 USC 2486l.

(1) \$10,000,000 for each of fiscal years 1988 and 1989; and

(2) \$15,000,000 for each of fiscal years 1990 and 1991.

(b) Such sums as may be appropriated under this section shall remain available until expended.

Land Remote-Sensing
Commercialization Act
Amendments of
1987.
15 USC 4201
note.
15 USC 4201
note.

TITLE III—AMENDMENTS TO THE LAND REMOTE-SENSING COMMERCIALIZATION ACT OF 1984

SEC. 301. This title may be cited as the "Land Remote-Sensing Commercialization Act Amendments of 1987".

SEC. 302. The Congress finds and declares that—

(1) the implementation of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4201 et seq.) has begun and some of the major milestones contained in that Act have been met;

(2) Congress remains strongly committed to the guiding principles set forth in that Act;

(3) notwithstanding the accomplishments thus far, the relationships among the involved Federal agencies and the private sector have not yet been adequately defined; and

(4) inasmuch as the technical development and commercial applications of future land remote-sensing systems cannot now be predicted with certainty, it is in the national interest of the United States that the involved Federal agencies and the private sector remain flexible in carrying out their respective responsibilities under that Act.

SEC. 303. It is therefore the purpose of this title to set forth amendments to the Land Remote-Sensing Commercialization Act of 1984 to ensure that—

(1) the original intent of that Act is carried out in the most effective manner consistent with the guiding principles expressed therein;

(2) specific mechanisms for carrying out the original intent of that Act are provided in those cases where none have materialized thus far; and

(3) the working relationships among involved Federal agencies and private sector parties for the purpose of carrying out that Act are fully developed and mutually understood.

SEC. 304. Section 202(a)(4) of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4212(a)(4)) is amended by inserting before the semicolon at the end thereof the following: "except in the case of research and development activities conducted in accordance with section 504".

SEC. 305. Title III of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4221 et seq.) is amended by adding at the end thereof the following new section:

"DISPOSITION OF GOVERNMENT ASSETS

"SEC. 308. Following the completion of a contract made pursuant to this title, the Secretary may, upon 30 days advance notice to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives, dispose of assets (other than real property) under the control of the Secretary in a manner which best ensures the continuation of the contractor's commercial activity."

SEC. 306. Section 502 of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4262) is amended to read as follows:

"RESEARCH AND DEVELOPMENT ACTIVITIES OF FEDERAL AGENCIES

"SEC. 502. Each Federal agency is authorized and encouraged to provide data gathered in experimental remote-sensing space pro-

Contracts.
15 USC 4228.

grams to related research and development programs funded by the Federal Government (including application programs) and to cooperative research programs if the Federal agency involved determines that the data will not be used—

"(1) for any commercial purpose; or

"(2) in substantial competition with data available from a licensee under this Act;

except pursuant to section 503."

SEC. 307. Title V of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4261 et seq.) is amended by adding at the end thereof the following new section:

"RESEARCH AND DEVELOPMENT ACTIVITIES OF SYSTEM OPERATORS

"SEC. 504. Notwithstanding section 601, any system operator under title II, III, or IV of this Act, or any marketing entity under section 503 of this Act, may provide data for any research and development programs if— 15 USC 4264.

"(1) a complete and timely disclosure of the results of such research and development is made in the open technical literature or is otherwise made publicly available;

"(2) the system operator or marketing entity provides to the Secretary an annual report of all research and development data transactions including the nature of any cooperative agreements and the prices charged for data; and Reports.

"(3) the data are not used for commercial purposes or in substantial competition with data available from a licensee under this Act."

SEC. 308. Section 603 of the Land Remote-Sensing Commercialization Act of 1984 (15 U.S.C. 4273) is amended to read as follows:

"NONREPRODUCTION

"SEC. 603. In addition to such other terms and conditions as the system operator may set forth in compliance with section 601 of this Act, the system operator may require that unenhanced data not be reproduced or disseminated by any foreign or domestic purchaser."

Approved October 30, 1987.

LEGISLATIVE HISTORY—H.R. 2782 (S. 1164):

HOUSE REPORTS: No. 100-204 (Comm. on Science, Space, and Technology).
CONGRESSIONAL RECORD, Vol. 133 (1987):

July 9, considered and passed House.

July 10, considered and passed Senate, amended, in lieu of S. 1164.

Oct. 8, House concurred in Senate amendment with amendment.

Oct. 13, Senate concurred in House amendment.

TITLE V—ENERGY AND ENVIRONMENT PROGRAMS

Subtitle A—Nuclear Waste Amendments

Nuclear Waste
Policy
Amendments
Act of 1987.
42 USC 10101
note.

SEC. 5001. SHORT TITLE.

This subtitle may be cited as the "Nuclear Waste Policy Amendments Act of 1987".

SEC. 5002. DEFINITIONS.

Section 2 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101) is amended by adding at the end the following new paragraphs:

"(30) The term 'Yucca Mountain site' means the candidate site in the State of Nevada recommended by the Secretary to the President under section 112(b)(1)(B) on May 27, 1986.

"(31) The term 'affected unit of local government' means the unit of local government with jurisdiction over the site of a repository or a monitored retrievable storage facility. Such term may, at the discretion of the Secretary, include units of local government that are contiguous with such unit.

"(32) The term 'Negotiator' means the Nuclear Waste Negotiator.

"(33) As used in title IV, the term 'Office' means the Office of the Nuclear Waste Negotiator established under title IV of this Act.

"(34) The term 'monitored retrievable storage facility' means the storage facility described in section 141(b)(1)."

PART A—REDIRECTION OF THE NUCLEAR WASTE PROGRAM

SEC. 5011. FIRST REPOSITORY.

(a) **SITE SPECIFIC ACTIVITIES.**—Title I of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10121-10171) is amended by adding at the end the following new subtitle:

"SUBTITLE E—REDIRECTION OF THE NUCLEAR WASTE PROGRAM

"SELECTION OF YUCCA MOUNTAIN SITE

42 USC 10172.

"SEC. 160. (a) IN GENERAL.—(1) The Secretary shall provide for an orderly phase-out of site specific activities at all candidate sites other than the Yucca Mountain site.

"(2) The Secretary shall terminate all site specific activities (other than reclamation activities) at all candidate sites, other than the Yucca Mountain site, within 90 days after the date of enactment of the Nuclear Waste Policy Amendments Act of 1987.

"(b) Effective on the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987, the State of Nevada shall be eligible to enter into a benefits agreement with the Secretary under section 170."

(b) SITE RECOMMENDATION TO THE PRESIDENT.—Section 112(b) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10132(b)) is amended by—

(1) striking out paragraph (1)(C) and redesignating the subsequent subparagraphs accordingly; and

(2) in subparagraph (C) ⁷³ (as redesignated) by striking "subparagraphs (B) and (C)" and inserting "subparagraph (B)".

(c) TERMINATION OF CANDIDATE SITE SCREENING.—Section 112 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10132) is amended by striking all of subsection (d) and redesignating subsequent subsections accordingly.

(d) TIMELY SITE CHARACTERIZATION.—Section 112 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10132) is amended by striking all of subsection (f) and redesignating subsequent subsections accordingly.

(e) SITE CHARACTERIZATION.—Section 113(a) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10133(a)) is amended—

(1) by striking "State involved" and all that follows through "tribe involved" and inserting "State of Nevada"; and

(2) by striking "beginning" and all that follows through "geological media" and inserting "at the Yucca Mountain site".

(f) COMMISSION AND STATES.—Section 113(b) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10133(b)) is amended—

(1) in paragraph (1)—

(A) by striking "any candidate site" and inserting "the Yucca Mountain site";

(B) by striking "either" and all that follows through "may be" and insert "the Governor or legislature of the State of Nevada";

(2) in paragraph (2), by striking "at any candidate site" and inserting "at the Yucca Mountain site"; and

(3) in paragraph (3)—

(A) by striking "a candidate site" and inserting "the Yucca Mountain site";

(B) by striking "either"; and

(C) by striking "the State" and all that follows through "may be" and inserting "the State of Nevada".

(g) RESTRICTIONS.—Section 113(c) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10133(c)) is amended—

(1) in paragraph (1)—

⁷³ Copy read "1(C), (as)".

(A) by striking "any candidate site" and inserting "the Yucca Mountain site"; and

(B) by striking "such candidate site" each place it appears and inserting "such site";

(2) in paragraph (2), by striking "candidate" each place it appears; and

(3) by striking paragraphs (3) and (4) and inserting the following:

"(3) If the Secretary at any time determines the Yucca Mountain site to be unsuitable for development as a repository, the Secretary shall—

"(A) terminate all site characterization activities at such site;

"(B) notify the Congress, the Governor and legislature of Nevada of such termination and the reasons for such termination;

"(C) remove any high-level radioactive waste, spent nuclear fuel, or other radioactive materials at or in such site as promptly as practicable;

"(D) take reasonable and necessary steps to reclaim the site and to mitigate any significant adverse environmental impacts caused by site characterization activities at such site;

"(E) suspend all future benefits payments under subtitle F with respect to such site; and

"(F) report to Congress not later than 6 months after such determination the Secretary's recommendations for further action to assure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority."

Reports.

(h) HEARINGS AND PRESIDENTIAL RECOMMENDATION.—Section 114(a) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10134(a)) is amended—

(1) in paragraph (1)—

(A) by striking "each site" through "development of a repository" and inserting "the Yucca Mountain site";

(B) by striking "in which such site is located";

(C) by striking "not less than 3" and all that follows through "subsequent repositories" and inserting "the Yucca Mountain site";

(D) by striking "in which such site" and all that follows through "case may be" and insert "of Nevada";

(E) by striking the sentence beginning with "In making site recommendations";

(F) by amending subparagraph (D) to read as follows:

"(D) a final environmental impact statement prepared for the Yucca Mountain site pursuant to subsection (f) and the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), together with comments made concerning such environmental impact statement by the Secretary of the Interior, the Council on Environmental Quality, the Administrator, and the Commission, except that the Secretary shall not be required in any such environmental impact statement to consider the need for a repository, the alternatives to geological disposal, or alternative sites to the Yucca Mountain site"; and

(G) in subparagraph (H), by striking "the State" and all that follows through the end of the sentence and inserting "the State of Nevada";

(2) by striking paragraphs (2) and (3) and inserting the following:

President of U.S.

"(2)(A) If, after recommendation by the Secretary, the President considers the Yucca Mountain site qualified for application for a construction authorization for a repository, the President shall submit a recommendation of such site to Congress.

"(B) The President shall submit with such recommendation a copy of the statement for such site prepared by the Secretary under paragraph (1)."; and

(3) in paragraph (4) by—

(A) striking "(4)(A)" and inserting "(3)(A)";

(B) striking "any site under this subsection" and inserting "the Yucca Mountain site"; and

(C) by striking "report" and inserting "statement".

(i) SUBMISSION OF APPLICATION.—Section 114(b) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10134(b)) is amended—

(1) by striking "a site for a repository" and inserting "the Yucca Mountain site"; and

(2) by striking "in which" and all that follows through "may be," and inserting "of Nevada".

(j) COMMISSION ACTION.—Section 114(d) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10134(d)) is amended in the first sentence—

(1) by striking "than—" and all that follows through "(2) the expiration" and inserting "than the expiration"; and

(2) by striking "(e)(2); whichever occurs later" and inserting "(e)(2)".

(k) PROJECT DECISION SCHEDULE.—Section 114(e) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10134(e)) is amended by striking "repository involved" and inserting "repository".

(l) ENVIRONMENTAL IMPACT STATEMENT.—Section 114(f) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10134(f)) is amended to read as follows:

"(f) ENVIRONMENTAL IMPACT STATEMENT.—(1) Any recommendation made by the Secretary under this section shall be considered a major Federal action significantly affecting the quality of the human environment for purposes of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.). A final environmental impact statement prepared by the Secretary under such Act shall accompany any recommendation to the President to approve a site for a repository.

"(2) With respect to the requirements imposed by the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), compliance with the procedures and requirements of this Act shall be deemed adequate consideration of the need for a repository, the time of the initial availability of a repository, and all alternatives to the isolation of high-level radioactive waste and spent nuclear fuel in a repository.

"(3) For purposes of complying with the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and this section, the Secretary need not consider alternate sites to the Yucca Mountain site for the repository to be developed under this subtitle.

"(4) Any environmental impact statement prepared in connection with a repository proposed to be constructed by the Secretary under this subtitle shall, to the extent practicable, be adopted by the Commission in connection with the issuance by the Commission of a

construction authorization and license for such repository. To the extent such statement is adopted by the Commission, such adoption shall be deemed to also satisfy the responsibilities of the Commission under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and no further consideration shall be required, except that nothing in this subsection shall affect any independent responsibilities of the Commission to protect the public health and safety under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.).

"(5) Nothing in this Act shall be construed to amend or otherwise detract from the licensing requirements of the Nuclear Regulatory Commission established in title II of the Energy Reorganization Act of 1974 (42 U.S.C. 5841 et seq.).

"(6) In any such statement prepared with respect to the repository to be constructed under this subtitle, the Nuclear Regulatory Commission need not consider the need for a repository, the time of initial availability of a repository, alternate sites to the Yucca Mountain site, or nongeologic alternatives to such site."

(m) **ON-SITE REPRESENTATIVE.**—Section 117 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10137) is amended by adding at the end the following new subsection:

"(d) **ON-SITE REPRESENTATIVE.**—The Secretary shall offer to any State, Indian-tribe or unit of local government within whose jurisdiction a site for a repository or monitored retrievable storage facility is located under this title an opportunity to designate a representative to conduct on-site oversight activities at such site. Reasonable expenses of such representatives shall be paid out of the Waste Fund."

SEC. 5012. SECOND REPOSITORY.

Subtitle E of title I of the Nuclear Waste Policy Act of 1982 (as created by section 5011 of this Act) is amended by adding at the end the following new section:

"SITING A SECOND REPOSITORY

"SEC. 161. (a) **CONGRESSIONAL ACTION REQUIRED.**—The Secretary may not conduct site-specific activities with respect to a second repository unless Congress has specifically authorized and appropriated funds for such activities. 42 USC 10172a.

"(b) **REPORT.**—The Secretary shall report to the President and to Congress on or after January 1, 2007, but not later than January 1, 2010, on the need for a second repository.

"(c) **TERMINATION OF GRANITE RESEARCH.**—Not later than 6 months after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987, the Secretary shall phase out in an orderly manner funding for all research programs in existence on such date of enactment designed to evaluate the suitability of crystalline rock as a potential repository host medium.

"(d) **ADDITIONAL SITING CRITERIA.**—In the event that the Secretary at any time after such date of enactment considers any sites in crystalline rock for characterization or selection as a repository, the Secretary shall consider (as a supplement to the siting guidelines under section 112) such potentially disqualifying factors as—

- "(1) seasonal increases in population;
- "(2) proximity to public drinking water supplies, including those of metropolitan areas; and
- "(3) the impact that characterization or siting decisions would have on lands owned or placed in trust by the United States for Indian tribes."

PUBLIC LAW 100-204—DEC. 22, 1987

101 STAT. 1331

Public Law 100-204
100th Congress

An Act

To authorize appropriations for fiscal years 1988 and 1989 for the Department of State, the United States Information Agency, the Voice of America, the Board for International Broadcasting, and for other purposes.

Dec. 22, 1987
[H.R. 1777]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE AND TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the "Foreign Relations Authorization Act, Fiscal Years 1988 and 1989".

Foreign
Relations
Authorization
Act, Fiscal Years
1988 and 1989.
22 USC 2651
note.

TITLE XI—GLOBAL CLIMATE
PROTECTION

Global Climate
Protection Act of
1987.
Environmental
protection.
Pollution.
15 USC 2901
note.

SEC. 1101. SHORT TITLE.

This title may be cited as the "Global Climate Protection Act of 1987".

101 STAT. 1408

PUBLIC LAW 100-204—DEC. 22, 1987

15 USC 2901
note.

SEC. 1102. FINDINGS.

The Congress finds as follows:

- (1) There exists evidence that manmade pollution—the release of carbon dioxide, chlorofluorocarbons, methane, and other trace gases into the atmosphere—may be producing a long-term and substantial increase in the average temperature on Earth, a phenomenon known as global warming through the greenhouse effect.
- (2) By early in the next century, an increase in Earth temperature could—
 - (A) so alter global weather patterns as to have an effect on existing agricultural production and on the habitability of large portions of the Earth; and
 - (B) cause thermal expansion of the oceans and partial melting of the polar ice caps and glaciers, resulting in rising sea levels.
- (3) Important research into the problem of climate change is now being conducted by various United States Government and international agencies, and the continuation and intensification of those efforts will be crucial to the development of an effective United States response.
- (4) While the consequences of the greenhouse effect may not be fully manifest until the next century, ongoing pollution and deforestation may be contributing now to an irreversible process. Necessary actions must be identified and implemented in time to protect the climate.
- (5) The global nature of this problem will require vigorous efforts to achieve international cooperation aimed at minimizing and responding to adverse climate change; such international cooperation will be greatly enhanced by United States leadership. A key step in international cooperation will be the meeting of the Governing Council of the United Nations Environment Program, scheduled for June 1989, which will seek to determine a direction for worldwide efforts to control global climate change.
- (6) Effective United States leadership in the international arena will depend upon a coordinated national policy.

International
organizations.

15 USC 2901
note.
International
agreements.
Research and
development.
Science and
technology.

SEC. 1103. MANDATE FOR ACTION ON THE GLOBAL CLIMATE.

(a) **GOALS OF UNITED STATES POLICY.**—United States policy should seek to—

- (1) increase worldwide understanding of the greenhouse effect and its environmental and health consequences;
- (2) foster cooperation among nations to develop more extensive and coordinated scientific research efforts with respect to the greenhouse effect;
- (3) identify technologies and activities to limit mankind's adverse effect on the global climate by—
 - (A) slowing the rate of increase of concentrations of greenhouse gases in the atmosphere in the near term; and
 - (B) stabilizing or reducing atmospheric concentrations of greenhouse gases over the long term; and
- (4) work toward multilateral agreements.

President of U.S.

(b) **FORMULATION OF UNITED STATES POLICY.**—The President, through the Environmental Protection Agency, shall be responsible for developing and proposing to Congress a coordinated national policy on global climate change. Such policy formulation shall con-

PUBLIC LAW 100-204—DEC. 22, 1987

101 STAT. 1409

sider research findings of the Committee on Earth Sciences of the Federal Coordinating Council on Science and Engineering Technology, the National Academy of Sciences, the National Oceanic and Atmospheric Administration, the National Science Foundation, the National Aeronautic and Space Administration, the Department of Energy, the Environmental Protection Agency, and other organizations engaged in the conduct of scientific research.

(c) **COORDINATION OF UNITED STATES POLICY IN THE INTERNATIONAL ARENA.**—The Secretary of State shall be responsible to coordinate those aspects of United States policy requiring action through the channels of multilateral diplomacy, including the United Nations Environment Program and other international organizations. In the formulation of these elements of United States policy, the Secretary of State shall, under the direction of the President, work jointly with the Administrator of the Environmental Protection Agency and other United States agencies concerned with environmental protection, consistent with applicable Federal law.

President of U.S.

SEC. 1104. REPORT TO CONGRESS.

Not later than 24 months after the date of enactment of this Act, the Secretary of State and the Administrator of the Environmental Protection Agency shall jointly submit to all committees of jurisdiction in the Congress a report which shall include—

- (1) a summary analysis of current international scientific understanding of the greenhouse effect, including its environmental and health consequences;
- (2) an assessment of United States efforts to gain international cooperation in limiting global climate change; and
- (3) a description of the strategy by which the United States intends to seek further international cooperation to limit global climate change.

15 USC 2901
note.

SEC. 1105. INTERNATIONAL YEAR OF GLOBAL CLIMATE PROTECTION.

In order to focus international attention and concern on the problem of global warming, and to foster further work on multilateral treaties aimed at protecting the global climate, the Secretary of State shall undertake all necessary steps to promote, within the United Nations system, the early designation of an International Year of Global Climate Protection.

15 USC 2901
note.

SEC. 1106. CLIMATE PROTECTION AND UNITED STATES-SOVIET RELATIONS.

In recognition of the respective leadership roles of the United States and the Soviet Union in the international arena, and of their joint role as the world's two major producers of atmospheric pollutants, the Congress urges that the President accord the problem of climate protection a high priority on the agenda of United States-Soviet relations.

Union of Soviet
Socialist
Republics.
15 USC 2901
note.

AIRPORT AND AIRWAY SAFETY AND CAPACITY EXPANSION ACT OF 1987

101 STAT. 1486

PUBLIC LAW 100-223—DEC. 30, 1987

Public Law 100-223
100th Congress

An Act

Dec. 30, 1987
[H.R. 2310]

Airport and
Airway Safety
and Capacity
Expansion Act of
1987.
Transportation.
49 USC app. 2201
note.

To amend the Airport and Airway Improvement Act of 1982 for the purpose of extending the authorization of appropriations for airport and airway improvements, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE AND TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the "Airport and Airway Safety and Capacity Expansion Act of 1987".

(b) **TABLE OF CONTENTS.**—

Sec. 1. Short title and table of contents.
Sec. 2. Secretary and Administrator defined.

TITLE I—AIRPORT AND AIRWAY IMPROVEMENT ACT AMENDMENTS

Sec. 101. Amendment of Airport and Airway Improvement Act of 1982.
Sec. 102. Declaration of policy.
Sec. 103. Definitions.
Sec. 104. National airport and airway system plans.
→ Sec. 105. Authorization of appropriations.
Sec. 106. Apportionment of funds.
Sec. 107. Limitations on uses of funds.
Sec. 108. State sponsorship.
Sec. 109. Project sponsorship.
Sec. 110. Grant agreements.
Sec. 111. Project costs.
Sec. 112. Limitation on powers.
Sec. 113. Part-time operation of flight service stations.
Sec. 114. Explosive detection K-9 teams.
Sec. 115. Denial of funds for projects using products or services of foreign countries that deny fair market opportunities.
Sec. 116. State block grant pilot program.

TITLE II—FEDERAL AVIATION ACT AMENDMENTS

Sec. 201. Amendment of Federal Aviation Act of 1958.
Sec. 202. Essential air service.
→ Sec. 203. Aircraft collision avoidance systems.
Sec. 204. Civil penalties.
Sec. 205. Indemnification of Federal Aviation Administration employees.
Sec. 206. Hazards to safe and efficient air commerce and the preservation of navigable airspace and airport traffic capacity.
Sec. 207. Public aircraft defined.

TITLE I—AIRPORT AND AIRWAY IMPROVEMENT ACT AMENDMENTS

SEC. 105. AUTHORIZATION OF APPROPRIATIONS.

(a) **AIRWAY FACILITIES AND EQUIPMENT.**—Section 506(a) is amended—

(1) by redesignating paragraph (2) (and any reference thereto) as paragraph (3); and

49 USC app.
2205.

(2) by striking out "For the purposes of" and all that follows through "remain available until expended." and inserting in lieu thereof the following:

"(1) GENERAL AUTHORIZATION.—For the purposes of acquiring, establishing, and improving air navigation facilities under section 307(b) of the Federal Aviation Act of 1958 (49 U.S.C. App. 1348(b)), there are authorized to be appropriated from the Trust Fund for fiscal years beginning after September 30, 1981, aggregate amounts not to exceed \$6,327,000,000 for fiscal years ending before October 1, 1987, \$7,704,000,000 for fiscal years ending before October 1, 1988, \$9,434,000,000 for fiscal years ending before October 1, 1989, and \$11,625,200,000 for fiscal years ending before October 1, 1990. Amounts appropriated under this subsection shall remain available until expended.

"(2) PURCHASE AND INSTALLATION OF INSTRUMENT LANDING SYSTEMS.—

"(A) MINIMUM OBLIGATION LEVEL.—Of amounts made available under paragraph (1) after September 30, 1987, the Secretary shall obligate not less than \$27,000,000 in fiscal year 1988, \$30,000,000 in fiscal year 1989, and \$35,000,000 in fiscal year 1990 for the purposes of purchasing and installing instrument landing systems at airports under section 307(b) of the Federal Aviation Act of 1958.

"(B) PRIMARY AND RELIEVER AIRPORTS.—75 percent of amounts obligated pursuant to subparagraph (A) in a fiscal year shall be made available for the purchase and installation of instrument landing systems at primary airports and reliever airports.

"(C) OTHER AIRPORTS.—25 percent of amounts obligated pursuant to subparagraph (A) in a fiscal year shall be made available for the purchase and installation of instrument landing systems at airports other than primary airports and reliever airports."

(b) RESEARCH, ENGINEERING AND DEVELOPMENT, AND DEMONSTRATIONS.—

(1) IN GENERAL.—Section 506(b) is amended to read as follows:

"(b) RESEARCH, ENGINEERING AND DEVELOPMENT, AND DEMONSTRATIONS.—

"(1) DEMONSTRATION PROJECTS.—The Secretary is authorized to carry out under section 312 of the Federal Aviation Act of 1958 (49 U.S.C. App. 1353) such demonstration projects as the Secretary determines necessary in connection with research and development activities under such section.

"(2) GENERAL AUTHORIZATION.—For research, engineering and development, and demonstration projects and activities under section 312 of the Federal Aviation Act of 1958 and paragraph (1) of this subsection, there is authorized to be appropriated from the Trust Fund—

"(A) for fiscal year 1988—

"(i) \$127,192,000 solely for air traffic control projects and activities;

"(ii) \$7,743,000 solely for air traffic control advanced computer projects and activities;

"(iii) \$9,818,000 solely for navigation projects and activities;

"(iv) \$21,957,000 solely for aviation weather projects and activities;

"(v) \$6,307,000 solely for aviation medicine projects and activities of which not less than \$250,000 shall be made available for research and development relating to equipment designed to provide improved access by handicapped persons to commercial aircraft;

"(vi) \$24,988,000 solely for aircraft safety projects and activities; and

"(vii) \$3,000,000 solely for environmental projects and activities;

"(B) for fiscal year 1989—

"(i) \$135,866,000 solely for air traffic control projects and activities;

"(ii) \$15,716,000 solely for air traffic control advanced computer projects and activities;

"(iii) \$11,395,000 solely for navigation projects and activities;

"(iv) \$21,797,000 solely for aviation weather projects and activities;

"(v) \$6,613,000 solely for aviation medicine projects and activities;

"(vi) \$21,013,000 solely for aircraft safety projects and activities; and

"(vii) \$2,600,000 solely for environmental projects and activities; and

"(C) for fiscal year 1990, \$222,000,000.

"(3) AUTHORITY TO TRANSFER FUNDS.—

"(A) UNLIMITED.—Funds may be transferred among the projects and activities listed in paragraph (2), except that the net funds transferred to or from any category of such projects and activities listed in paragraph (2) in any fiscal year may not exceed 10 percent of the amount authorized for such category by paragraph (2) for such fiscal year.

"(B) AFTER NOTICE.—In addition, the Secretary may propose transfers to or from any category of projects and activities listed in paragraph (2) exceeding 10 percent of the amount authorized for such category. An explanation of the proposed transfer must be transmitted in writing to the Committee on Science, Space, and Technology and the Committee on Appropriations of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Appropriations of the Senate. The proposed transfer may be made only when—

"(i) 30 calendar days have passed after transmission of such explanation; or

"(ii) each such Committee has transmitted to the Secretary written notice that such Committee has no objection to the proposed transfer.

"(4) FUNDING FOR ENHANCING AIRPORT CAPACITY.—

"(A) GENERAL RULE.—Notwithstanding any other provision of this subsection, of funds made available under paragraph (2) in each of fiscal years 1988, 1989, and 1990, not less than \$25,000,000 per fiscal year is authorized to be appropriated for research and development on preserving and enhancing airport capacity (including research and

development on improvements to airport design standards, airport maintenance, airport safety, airport operations, and airport environmental concerns) under section 312 of the Federal Aviation Act of 1958.

"(B) REPORT.—Not later than 60 days after the last day of each of fiscal years 1988, 1989, and 1990, the Administrator of the Federal Aviation Administration shall transmit to the Committee on Science, Space, and Technology and the Committee on Public Works and Transportation of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on expenditures made by the Administrator for research and development under subparagraph (A) in such fiscal year.

"(5) PERIOD OF AVAILABILITY.—Amounts appropriated under this subsection shall remain available until expended."

(2) EFFECTIVE DATE.—The amendment made by paragraph (1) shall take effect October 1, 1987.

(c) OTHER EXPENSES.—

(1) GENERAL LIMITATIONS.—Section 506(c) is amended by adding at the end thereof the following new paragraph:

"(3) FISCAL YEARS 1988-1990.—

"(A) MAXIMUM AMOUNT APPROPRIATED.—Subject to subparagraph (B) of this paragraph, the amount appropriated from the Trust Fund for the purposes of clauses (A) and (B) of paragraph (1) of this subsection for each of fiscal years 1988, 1989, and 1990 may not exceed 50 percent of the amount of funds made available under section 505 and subsections (a) and (b) of this section for such fiscal year.

"(B) REDUCTION IN MAXIMUM AMOUNT.—The maximum amount which may be appropriated from the Trust Fund for the purposes of clauses (A) and (B) of paragraph (1) for any fiscal year, as determined under subparagraph (A) of this paragraph, shall be reduced by an amount equal to 2 times the excess, if any, of—

"(i) \$3,278,000,000 in the case of fiscal year 1988, \$3,445,000,000 in the case of fiscal year 1989, \$3,863,000,000 in the case of fiscal year 1990, \$3,770,000,000 in the case of fiscal year 1991, and \$3,778,000,000 in the case of fiscal year 1992, over

"(ii) the amount made available under section 505 and subsections (a) and (b) of this section for such fiscal year.

"(C) INCREASE IN MAXIMUM AMOUNT.—Subject to subparagraph (D), the amount authorized to be appropriated from the Trust Fund under this paragraph for any fiscal year shall be increased by an amount equal to 2 times the excess, if any, of—

"(i) the amount made available under section 505 and subsections (a) and (b) of this section for such fiscal year, over

"(ii) the portion of the amount authorized under such section and subsections for such fiscal year which was not authorized for any previous fiscal year.

"(D) LIMITATION ON INCREASES.—The aggregate amount of increases in the amount authorized to be appropriated from the Trust Fund under this paragraph may not exceed the

49 USC app. 2205
note.

49 USC app.
2205.

aggregate amount of reductions made under subparagraph (B) of this paragraph."

(2) **LIMITATION ON FUNDING FOR WEATHER SERVICES.**—Section 506(d) is amended—

49 USC app.
2205.

(A) by striking out "\$26,700,000" and all that follows through "1986; and"; and

(B) by inserting before the period at the end thereof the following: "and \$30,000,000 per fiscal year for each of fiscal years 1988, 1989, and 1990".

(d) **LIMITATION ON USES OF TRUST FUND.**—

(1) **FUNDING OF AIRPORT IMPROVEMENT PROGRAM.**—Section 506(e)(1) is amended by inserting "and section 505" before the period.

(2) **EXTENSION.**—Section 506(e)(5) is amended by striking out "1987" and inserting in lieu thereof "1992".

(e) **AIRPORT DEVELOPMENT AND PLANNING.**—Section 505(a) is amended by striking out the second sentence and inserting in lieu thereof the following: "The aggregate amounts which shall be available after September 30, 1981, to the Secretary for such grants and for grants for airport noise compatibility planning under section 103(b) of the Aviation Safety and Noise Abatement Act of 1979 and for carrying out noise compatibility programs or parts thereof under section 104(c) of such Act shall be \$5,116,700,000 of which \$475,000,000 shall be credited to the supplementary discretionary fund established by section 507(a)(3)(B) for fiscal years ending before October 1, 1987, \$6,816,700,000 for fiscal years ending before October 1, 1988, \$8,516,700,000 for fiscal years ending before October 1, 1989, \$10,216,700,000 for fiscal years ending before October 1, 1990, \$12,016,700,000 for fiscal years ending before October 1, 1991, and \$13,816,700,000 for fiscal years ending before October 1, 1992.".

49 USC app.
2204.

(f) **DISADVANTAGED BUSINESS ENTERPRISES.**—Section 505 is amended by adding at the end thereof the following new subsection:

"(d) **DISADVANTAGED BUSINESS ENTERPRISES.**—

"(1) **GENERAL RULE.**—Except to the extent that the Secretary determines otherwise, not less than 10 percent of the amounts made available under subsection (a) in a fiscal year beginning after September 30, 1987, shall be expended with small business concerns owned and controlled by socially and economically disadvantaged individuals.

"(2) **DEFINITIONS.**—For purposes of this subsection—

"(A) **SMALL BUSINESS CONCERN.**—The term 'small business concern' has the meaning such term has under section 3 of the Small Business Act (15 U.S.C. 632); except that such term shall not include any concern or group of concerns controlled by the same socially and economically disadvantaged individual or individuals which has average annual gross receipts over the preceding 3 fiscal years in excess of \$14,000,000, as adjusted by the Secretary for inflation.

"(B) **SOCIALLY AND ECONOMICALLY DISADVANTAGED INDIVIDUALS.**—The term 'socially and economically disadvantaged individuals' has the meaning such term has under section 8(d) of the Small Business Act (15 U.S.C. 637(d)) and relevant subcontracting regulations promulgated pursuant thereto; except that women shall be presumed to be socially and economically disadvantaged for purposes of this subsection.

"(3) ANNUAL LISTING OF DISADVANTAGED BUSINESS ENTERPRISES.—Each State or airport sponsor shall annually survey and compile a list of the small business concerns referred to in paragraph (1) and the location of such concerns in the State.

"(4) UNIFORM CERTIFICATION.—The Secretary shall establish minimum uniform criteria for State governments and airport sponsors to use in certifying whether a concern qualifies for purposes of this subsection. Such minimum uniform criteria shall include but not be limited to on-site visits, personal interviews, licenses, analysis of stock ownership, listing of equipment, analysis of bonding capacity, listing of work completed, resume of principal owners, financial capacity, and type of work preferred."

49 USC app.
2205.

(g) CONFORMING AMENDMENTS.—(1) Section 506(a) is further amended—

(A) in paragraph (3), as redesignated by subsection (a)(1) of this section, by inserting "SITE PREPARATION WORK.—" before "The costs of"; and

(B) aligning such paragraph (3) with paragraph (1), as inserted by subsection (a)(2) of this section.

(2) Section 506(c) is further amended—

(A) in paragraph (1) by inserting "DESCRIPTION.—" before "The balance";

(B) in paragraph (2) by inserting "FISCAL YEARS 1982-1987.—" before "The amount appropriated"; and

(C) by indenting paragraph (1) and aligning such paragraph and paragraph (2) with paragraph (3) of such section, as added by subsection (c) of this section.

(3) Section 506(e)(2) is amended by striking out "and (d) and the third sentence of section (c)" and inserting in lieu thereof "(c), and (d)".

(h) SPECIAL RULE FOR HAWAII.—Notwithstanding any other provision of law, funds made available to the State of Hawaii under section 505 of the Airport and Airway Improvement Act of 1982 may be used to acquire properties referred to as areas 46A and 46B of the United States General Services Administration Facility Site in Moanalua, Honolulu, Oahu, Hawaii, or to reimburse the State of Hawaii for such acquisition.

TITLE II—FEDERAL AVIATION ACT AMENDMENTS

49 USC app. 1421 SEC. 203. AIRCRAFT COLLISION AVOIDANCE SYSTEMS.
note.

(a) FINDINGS.—Congress finds that—

(1) the number of near midair collisions is an indication that additional measures must be taken to assure the highest level of air safety in the United States;

(2) public health and safety requirements necessitate the timely completion and installation of a collision avoidance system for use by commercial aircraft flying in the United States;

(3) the Traffic Alert and Collision Avoidance System promises to reduce the threat to life caused by midair collisions, particularly collisions between general aviation aircraft and commercial aircraft;

(4) the Traffic Alert and Collision Avoidance System will succeed only to the degree that other aircraft posing a collision threat use operating transponders with automatic altitude reporting capability; and

(5) the Federal Aviation Administration should continue at a deliberate pace the development of additional technologies, including the collision avoidance system known as TCAS-III, to ensure the safe separation of aircraft.

49 USC app.
1421.

(b) **GENERAL RULES.**—Section 601 is amended by adding at the end the following new subsection:

"(f) **COLLISION AVOIDANCE SYSTEMS.**—

"(1) **DEVELOPMENT AND CERTIFICATION.**—

"(A) **STANDARDS.**—The Administrator shall complete development of the collision avoidance system known as TCAS-II so that such system will be operable under visual and instrument flight rules and will be upgradable to the performance standards applicable to the collision avoidance system known as TCAS-III.

"(B) **SCHEDULE.**—The Administrator shall develop and implement a schedule for development and certification of the collision avoidance system known as TCAS-II which will result in completion of such certification not later than 18 months after the date of the enactment of this subsection.

"(C) **MONTHLY REPORTS.**—The Administrator shall transmit to Congress monthly reports on the progress being

PUBLIC LAW 100-223—DEC. 30, 1987

101 STAT. 1519

made in development and certification of the collision avoidance system known as TCAS-II.

"(2) **INSTALLATION.**—The Administrator shall require by regulation that, not later than 30 months after the date of certification of the collision avoidance system known as TCAS-II, such system be installed and operated on each civil aircraft which has a maximum passenger capacity of more than 30 seats and which is used to provide air transportation of passengers, including intrastate air transportation of passengers.

Regulations.

"(3) **TRANSPONDERS.**—Not later than 6 months after the date of the enactment of this subsection, the Administrator shall promulgate a final rule requiring the installation and use of operating transponders with automatic altitude reporting capability for aircraft operating in designated terminal airspace where radar service is provided for separation of aircraft. For such terminal airspace, other than Terminal Control Areas and Airport Radar Service Areas, the Administrator may provide for access to such airspace by nonequipped aircraft if the Administrator determines that such access will not interfere with the normal traffic flow. Such final rule shall require the installation and use of such transponders not later than 36 months after the date of the enactment of this subsection."

Regulations.

(c) **CONFORMING AMENDMENT.**—That portion of table of contents contained in the first section of the Federal Aviation Act of 1958 which appears under the heading

"Sec. 601. General safety powers and duties."

is amended by adding at the end the following:

"(f) Collision avoidance systems."

(d) **COMPLETION OF RESEARCH AND DEVELOPMENT.**—

(1) **GENERAL RULE.**—The Administrator shall complete the research and the development on, and the certification of, the collision avoidance system known as TCAS-III as soon as possible.

49 USC app. 1421
note.

(2) **AUTHORIZATION OF APPROPRIATION.**—There are authorized to be appropriated such sums as may be necessary from the Airport and Airway Trust Fund to carry out this subsection.

PUBLIC LAW 100-235—JAN. 8, 1988

COMPUTER SECURITY ACT OF
1987

101 STAT. 1724

PUBLIC LAW 100-235—JAN. 8, 1988

Public Law 100-235
100th Congress

An Act

Jan. 8, 1988
[H.R. 145]

Computer
Security Act of
1987.
Classified
information.
40 USC 759 note.
40 USC 759 note.

To provide for a computer standards program within the National Bureau of Standards, to provide for Government-wide computer security, and to provide for the training in security matters of persons who are involved in the management, operation, and use of Federal computer systems, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Computer Security Act of 1987".

SEC. 2. PURPOSE.

(a) **IN GENERAL.**—The Congress declares that improving the security and privacy of sensitive information in Federal computer systems is in the public interest, and hereby creates a means for establishing minimum acceptable security practices for such systems, without limiting the scope of security measures already planned or in use.

(b) **SPECIFIC PURPOSES.**—The purposes of this Act are—

(1) by amending the Act of March 3, 1901, to assign to the National Bureau of Standards responsibility for developing standards and guidelines for Federal computer systems, including responsibility for developing standards and guidelines needed to assure the cost-effective security and privacy of sensitive information in Federal computer systems, drawing on the technical advice and assistance (including work products) of the National Security Agency, where appropriate;

(2) to provide for promulgation of such standards and guidelines by amending section 111(d) of the Federal Property and Administrative Services Act of 1949;

(3) to require establishment of security plans by all operators of Federal computer systems that contain sensitive information; and

(4) to require mandatory periodic training for all persons involved in management, use, or operation of Federal computer systems that contain sensitive information.

SEC. 3. ESTABLISHMENT OF COMPUTER STANDARDS PROGRAM.

The Act of March 3, 1901 (15 U.S.C. 271-278h), is amended—

15 USC 272.

(1) in section 2(f), by striking out "and" at the end of paragraph (18), by striking out the period at the end of paragraph (19) and inserting in lieu thereof: "; and", and by inserting after such paragraph the following:

"(20) the study of computer systems (as that term is defined in section 20(d) of this Act) and their use to control machinery and processes."

15 USC 278h.

(2) by redesignating section 20 as section 22, and by inserting after section 19 the following new sections:

15 USC 278g-3.

"Sec. 20. (a) The National Bureau of Standards shall—

"(1) have the mission of developing standards, guidelines, and associated methods and techniques for computer systems;

"(2) except as described in paragraph (3) of this subsection (relating to security standards), develop uniform standards and guidelines for Federal computer systems, except those systems excluded by section 2315 of title 10, United States Code, or section 3502(2) of title 44, United States Code;

"(3) have responsibility within the Federal Government for developing technical, management, physical, and administrative standards and guidelines for the cost-effective security and privacy of sensitive information in Federal computer systems except—

"(A) those systems excluded by section 2315 of title 10, United States Code, or section 3502(2) of title 44, United States Code; and

"(B) those systems which are protected at all times by procedures established for information which has been specifically authorized under criteria established by an Executive order or an Act of Congress to be kept secret in the interest of national defense or foreign policy,

the primary purpose of which standards and guidelines shall be to control loss and unauthorized modification or disclosure of sensitive information in such systems and to prevent computer-related fraud and misuse;

"(4) submit standards and guidelines developed pursuant to paragraphs (2) and (3) of this subsection, along with recommendations as to the extent to which these should be made compulsory and binding, to the Secretary of Commerce for promulgation under section 111(d) of the Federal Property and Administrative Services Act of 1949;

"(5) develop guidelines for use by operators of Federal computer systems that contain sensitive information in training their employees in security awareness and accepted security practice, as required by section 5 of the Computer Security Act of 1987; and

"(6) develop validation procedures for, and evaluate the effectiveness of, standards and guidelines developed pursuant to paragraphs (1), (2), and (3) of this subsection through research and liaison with other government and private agencies.

"(b) In fulfilling subsection (a) of this section, the National Bureau of Standards is authorized—

"(1) to assist the private sector, upon request, in using and applying the results of the programs and activities under this section;

"(2) to make recommendations, as appropriate, to the Administrator of General Services on policies and regulations proposed pursuant to section 111(d) of the Federal Property and Administrative Services Act of 1949;

"(3) as requested, to provide to operators of Federal computer systems technical assistance in implementing the standards and guidelines promulgated pursuant to section 111(d) of the Federal Property and Administrative Services Act of 1949;

"(4) to assist, as appropriate, the Office of Personnel Management in developing regulations pertaining to training, as required by section 5 of the Computer Security Act of 1987;

"(5) to perform research and to conduct studies, as needed, to determine the nature and extent of the vulnerabilities of, and to

Regulations.

devise techniques for the cost-effective security and privacy of sensitive information in Federal computer systems; and

"(6) to coordinate closely with other agencies and offices (including, but not limited to, the Departments of Defense and Energy, the National Security Agency, the General Accounting Office, the Office of Technology Assessment, and the Office of Management and Budget)—

"(A) to assure maximum use of all existing and planned programs, materials, studies, and reports relating to computer systems security and privacy, in order to avoid unnecessary and costly duplication of effort; and

"(B) to assure, to the maximum extent feasible, that standards developed pursuant to subsection (a) (3) and (5) are consistent and compatible with standards and procedures developed for the protection of information in Federal computer systems which is authorized under criteria established by Executive order or an Act of Congress to be kept secret in the interest of national defense or foreign policy.

"(c) For the purposes of—

"(1) developing standards and guidelines for the protection of sensitive information in Federal computer systems under subsections (a)(1) and (a)(3), and

"(2) performing research and conducting studies under subsection (b)(5),

the National Bureau of Standards shall draw upon computer system technical security guidelines developed by the National Security Agency to the extent that the National Bureau of Standards determines that such guidelines are consistent with the requirements for protecting sensitive information in Federal computer systems.

"(d) As used in this section—

"(1) the term 'computer system'—

"(A) means any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception, of data or information; and

"(B) includes—

"(i) computers;

"(ii) ancillary equipment;

"(iii) software, firmware, and similar procedures;

"(iv) services, including support services; and

"(v) related resources as defined by regulations issued by the Administrator for General Services pursuant to section 111 of the Federal Property and Administrative Services Act of 1949;

"(2) the term 'Federal computer system'—

"(A) means a computer system operated by a Federal agency or by a contractor of a Federal agency or other organization that processes information (using a computer system) on behalf of the Federal Government to accomplish a Federal function; and

"(B) includes automatic data processing equipment as that term is defined in section 111(a)(2) of the Federal Property and Administrative Services Act of 1949;

"(3) the term 'operator of a Federal computer system' means a Federal agency, contractor of a Federal agency, or other organization that processes information using a computer

system on behalf of the Federal Government to accomplish a Federal function;

"(4) the term 'sensitive information' means any information, the loss, misuse, or unauthorized access to or modification of which could adversely affect the national interest or the conduct of Federal programs, or the privacy to which individuals are entitled under section 552a of title 5, United States Code (the Privacy Act), but which has not been specifically authorized under criteria established by an Executive order or an Act of Congress to be kept secret in the interest of national defense or foreign policy; and

"(5) the term 'Federal agency' has the meaning given such term by section 3(b) of the Federal Property and Administrative Services Act of 1949.

15 USC 278g-4.

"SEC. 21. (a) There is hereby established a Computer System Security and Privacy Advisory Board within the Department of Commerce. The Secretary of Commerce shall appoint the chairman of the Board. The Board shall be composed of twelve additional members appointed by the Secretary of Commerce as follows:

"(1) four members from outside the Federal Government who are eminent in the computer or telecommunications industry, at least one of whom is representative of small or medium sized companies in such industries;

"(2) four members from outside the Federal Government who are eminent in the fields of computer or telecommunications technology, or related disciplines, but who are not employed by or representative of a producer of computer or telecommunications equipment; and

"(3) four members from the Federal Government who have computer systems management experience, including experience in computer systems security and privacy, at least one of whom shall be from the National Security Agency.

"(b) The duties of the Board shall be—

"(1) to identify emerging managerial, technical, administrative, and physical safeguard issues relative to computer systems security and privacy;

"(2) to advise the Bureau of Standards and the Secretary of Commerce on security and privacy issues pertaining to Federal computer systems; and

"(3) to report its findings to the Secretary of Commerce, the Director of the Office of Management and Budget, the Director of the National Security Agency, and the appropriate committees of the Congress.

Reports.

"(c) The term of office of each member of the Board shall be four years, except that—

"(1) of the initial members, three shall be appointed for terms of one year, three shall be appointed for terms of two years, three shall be appointed for terms of three years, and three shall be appointed for terms of four years; and

"(2) any member appointed to fill a vacancy in the Board shall serve for the remainder of the term for which his predecessor was appointed.

"(d) The Board shall not act in the absence of a quorum, which shall consist of seven members.

"(e) Members of the Board, other than full-time employees of the Federal Government, while attending meetings of such committees or while otherwise performing duties at the request of the Board

Chairman while away from their homes or a regular place of business, may be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5, United States Code.

"(f) To provide the staff services necessary to assist the Board in carrying out its functions, the Board may utilize personnel from the National Bureau of Standards or any other agency of the Federal Government with the consent of the head of the agency.

"(g) As used in this section, the terms 'computer system' and 'Federal computer system' have the meanings given in section 20(d) of this Act."; and

(3) by adding at the end thereof the following new section:

"Sec. 23. This Act may be cited as the National Bureau of Standards Act."

National Bureau
of Standards Act.
15 USC 271 note.

SEC. 4. AMENDMENT TO BROOKS ACT.

Section 111(d) of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 759(d)) is amended to read as follows:

"(d)(1) The Secretary of Commerce shall, on the basis of standards and guidelines developed by the National Bureau of Standards pursuant to section 20(a) (2) and (3) of the National Bureau of Standards Act, promulgate standards and guidelines pertaining to Federal computer systems, making such standards compulsory and binding to the extent to which the Secretary determines necessary to improve the efficiency of operation or security and privacy of Federal computer systems. The President may disapprove or modify such standards and guidelines if he determines such action to be in the public interest. The President's authority to disapprove or modify such standards and guidelines may not be delegated. Notice of such disapproval or modification shall be submitted promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental Affairs of the Senate and shall be published promptly in the Federal Register. Upon receiving notice of such disapproval or modification, the Secretary of Commerce shall immediately rescind or modify such standards or guidelines as directed by the President.

President of U.S.

Federal
Register,
publication.

"(2) The head of a Federal agency may employ standards for the cost-effective security and privacy of sensitive information in a Federal computer system within or under the supervision of that agency that are more stringent than the standards promulgated by the Secretary of Commerce, if such standards contain, at a minimum, the provisions of those applicable standards made compulsory and binding by the Secretary of Commerce.

"(3) The standards determined to be compulsory and binding may be waived by the Secretary of Commerce in writing upon a determination that compliance would adversely affect the accomplishment of the mission of an operator of a Federal computer system, or cause a major adverse financial impact on the operator which is not offset by Government-wide savings. The Secretary may delegate to the head of one or more Federal agencies authority to waive such standards to the extent to which the Secretary determines such action to be necessary and desirable to allow for timely and effective implementation of Federal computer systems standards. The head of such agency may redelegate such authority only to a senior official designated pursuant to section 3506(b) of title 44, United States Code. Notice of each such waiver and delegation shall be transmitted promptly to the Committee on Government Operations of the House of Representatives and the Committee on Governmental

Federal
Register,
publication.

Affairs of the Senate and shall be published promptly in the Federal Register.

"(4) The Administrator shall revise the Federal information resources management regulations (41 CFR ch. 201) to be consistent with the standards and guidelines promulgated by the Secretary of Commerce under this subsection.

Regulations.

"(5) As used in this subsection, the terms 'Federal computer system' and 'operator of a Federal computer system' have the meanings given in section 20(d) of the National Bureau of Standards Act."

SEC. 5. FEDERAL COMPUTER SYSTEM SECURITY TRAINING.

40 USC 759 note.

(a) **IN GENERAL.**—Each Federal agency shall provide for the mandatory periodic training in computer security awareness and accepted computer security practice of all employees who are involved with the management, use, or operation of each Federal computer system within or under the supervision of that agency. Such training shall be—

(1) provided in accordance with the guidelines developed pursuant to section 20(a)(5) of the National Bureau of Standards Act (as added by section 3 of this Act), and in accordance with the regulations issued under subsection (c) of this section for Federal civilian employees; or

(2) provided by an alternative training program approved by the head of that agency on the basis of a determination that the alternative training program is at least as effective in accomplishing the objectives of such guidelines and regulations.

(b) **TRAINING OBJECTIVES.**—Training under this section shall be started within 60 days after the issuance of the regulations described in subsection (c). Such training shall be designed—

(1) to enhance employees' awareness of the threats to and vulnerability of computer systems; and

(2) to encourage the use of improved computer security practices.

(c) **REGULATIONS.**—Within six months after the date of the enactment of this Act, the Director of the Office of Personnel Management shall issue regulations prescribing the procedures and scope of the training to be provided Federal civilian employees under subsection (a) and the manner in which such training is to be carried out.

SEC. 6. ADDITIONAL RESPONSIBILITIES FOR COMPUTER SYSTEMS SECURITY AND PRIVACY.

40 USC 759 note.

(a) **IDENTIFICATION OF SYSTEMS THAT CONTAIN SENSITIVE INFORMATION.**—Within 6 months after the date of enactment of this Act, each Federal agency shall identify each Federal computer system, and system under development, which is within or under the supervision of that agency and which contains sensitive information.

(b) **SECURITY PLAN.**—Within one year after the date of enactment of this Act, each such agency shall, consistent with the standards, guidelines, policies, and regulations prescribed pursuant to section 111(d) of the Federal Property and Administrative Services Act of 1949, establish a plan for the security and privacy of each Federal computer system identified by that agency pursuant to subsection (a) that is commensurate with the risk and magnitude of the harm resulting from the loss, misuse, or unauthorized access to or modification of the information contained in such system. Copies of each such plan shall be transmitted to the National Bureau of Standards

101 STAT. 1730

PUBLIC LAW 100-235—JAN. 8, 1988

and the National Security Agency for advice and comment. A summary of such plan shall be included in the agency's five-year plan required by section 3505 of title 44, United States Code. Such plan shall be subject to disapproval by the Director of the Office of Management and Budget. Such plan shall be revised annually as necessary.

40 USC 759 note. **SEC. 7. DEFINITIONS.**

As used in this Act, the terms "computer system", "Federal computer system", "operator of a Federal computer system", "sensitive information", and "Federal agency" have the meanings given in section 20(d) of the National Bureau of Standards Act (as added by section 3 of this Act).

40 USC 759 note. **SEC. 8. RULES OF CONSTRUCTION OF ACT.**

Nothing in this Act, or in any amendment made by this Act, shall be construed—

Public
information.

(1) to constitute authority to withhold information sought pursuant to section 552 of title 5, United States Code; or

(2) to authorize any Federal agency to limit, restrict, regulate, or control the collection, maintenance, disclosure, use, transfer, or sale of any information (regardless of the medium in which the information may be maintained) that is—

(A) privately-owned information;

(B) disclosable under section 552 of title 5, United States Code, or other law requiring or authorizing the public disclosure of information; or

(C) public domain information.

Approved January 8, 1988.

LEGISLATIVE HISTORY—H.R. 145:

HOUSE REPORTS: No. 100-153, Pt. 1 (Comm. on Science, Space, and Technology) and Pt. 2 (Comm. on Government Operations).

CONGRESSIONAL RECORD, Vol. 133 (1987):

June 22, considered and passed House.

Dec. 21, considered and passed Senate.

Public Law 100-252
100th Congress

An Act

Feb. 29, 1988
[H.R. 1612]

To authorize appropriations under the Earthquake Hazards Reduction Act of 1977 for fiscal years 1988, 1989, and 1990.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) section 7(a) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7706(a)) is amended by adding at the end the following:

"(7) There are authorized to be appropriated to the Director, to carry out the provisions of sections 5 and 6 of this Act, \$5,778,000 for the fiscal year ending September 30, 1988, \$5,788,000 for the fiscal year ending September 30, 1989, and \$5,798,000 for the fiscal year ending September 30, 1990."

(b) Section 7(b) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7706(b)) is amended—

(1) by striking "and" after "1986;"; and

(2) by inserting immediately before the period the following:
"; \$38,540,000 for the fiscal year ending September 30, 1988;
\$41,819,000 for the fiscal year ending September 30, 1989; and
\$43,283,000 for the fiscal year ending September 30, 1990".

(c) Section 7(c) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7706(c)) is amended—

(1) by striking "and" after "1986;"; and

(2) by inserting immediately before the period the following:
"; \$28,235,000 for the fiscal year ending September 30, 1988;
\$31,634,000 for the fiscal year ending September 30, 1989; and
\$35,454,000 for the fiscal year ending September 30, 1990".

(d) Section 7(d) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7706(d)) is amended—

(1) by striking "and" after "1986;"; and

(2) by inserting immediately before the period the following:
"; \$525,000 for the fiscal year ending September 30, 1988;
\$525,000 for the fiscal year ending September 30, 1989; and
\$525,000 for the fiscal year ending September 30, 1990".

SEC. 2. Section 5 of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7704) is amended by adding at the end the following:

"(j) COST SHARING.—(1) In the case of any State which has voluntarily engaged in cost sharing by matching Federal grants from the Federal Emergency Management Agency for activities under this Act over the three-fiscal-year period ending September 30, 1987, any such cost sharing that may be required for the fiscal year ending September 30, 1988, or the fiscal year ending September 30, 1989, shall be at a level no higher than the State's average level of such cost sharing over such three-year period.

"(2) In the case of any State which has not engaged in cost sharing by matching Federal grants from the Federal Emergency Management Agency for activities under this Act over such three-fiscal-year period—

"(A) no such cost sharing may be required for the fiscal year ending September 30, 1988; and

"(B) any such cost sharing that may be required for the fiscal year ending September 30, 1989, shall be at a level no higher than 25 percent of the cost of the activities involved.

"(3) Nothing in this subsection shall be construed to prevent a State, voluntarily and at its option, from engaging in cost sharing at a level higher than the maximum level which may be required of it under paragraph (1) or (2)."

Approved February 29, 1988.

LEGISLATIVE HISTORY—H.R. 1612:

HOUSE REPORTS: No. 100-89, Pt. 1 (Comm. on Interior and Insular Affairs) and Pt. 2 (Comm. on Science, Space, and Technology).

SENATE REPORTS: No. 100-239 (Comm. on Commerce, Science, and Transportation).

CONGRESSIONAL RECORD:

Vol. 133 (1987): June 8, considered and passed House.

Dec. 21, considered and passed Senate, amended.

Vol. 134 (1988): Feb. 16, House concurred in Senate amendment.

PUBLIC LAW 100-408—AUG. 20, 1988

PRICE-ANDERSON AMENDMENTS ACT OF
1988

102 STAT. 1066

PUBLIC LAW 100-408—AUG. 20, 1988

Public Law 100-408
100th Congress

An Act

Aug. 20, 1988

[H.R. 1414]

Price-Anderson
Amendments
Act of 1988.
42 USC 2011
note.

To amend the Price-Anderson provisions of the Atomic Energy Act of 1954 to extend and improve the procedures for liability and indemnification for nuclear incidents.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Price-Anderson Amendments Act of 1988".

SEC. 2. FINANCIAL PROTECTION.

(a) PRIMARY FINANCIAL PROTECTION AMOUNT REQUIRED FOR LARGE ELECTRICAL GENERATING FACILITIES.—Section 170 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(b)) is amended—

(1) by inserting "primary" before "financial protection" the first, second, third, and sixth places it appears;

(2) by inserting before the period at the end of the proviso in the first sentence the following: "(excluding the amount of private liability insurance available under the industry retrospective rating plan required in this subsection)"; and

(3) by striking in the third sentence all that precedes "private liability insurance" and inserting the following: "The Commission shall require licensees that are required to have and maintain primary financial protection equal to the maximum amount of liability insurance available from private sources to maintain, in addition to such primary financial protection,".

(b) STANDARD DEFERRED PREMIUM AMOUNT.—Section 170 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(b)) is amended—

(1) in the second proviso of the third sentence by striking "That" and all that follows through "protection" and inserting the following: "That the maximum amount of the standard deferred premium that may be charged a licensee following any nuclear incident under such a plan shall not be more than \$63,000,000 (subject to adjustment for inflation under subsection t.), but not more than \$10,000,000 in any 1 year, for each facility for which such licensee is required to maintain the maximum amount of primary financial protection"; and

(2) in the third proviso of the third sentence, by adding after "and costs" the following: "(excluding legal costs subject to subsection o. (1)(D), payment of which has not been authorized under such subsection)".

(c) LESSER ANNUAL DEFERRED PREMIUM AMOUNTS.—Section 170 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(b)) is amended—

(1) by inserting "(1)" after the subsection designation;

(2) in the first sentence, by redesignating clauses (1) through

(3) as clauses (A) through (C), respectively;

(3) by striking the fifth and sixth sentences; and

(4) by adding at the end of the fourth sentence the following new paragraph:

"(2)(A) The Commission may, on a case by case basis, assess annual deferred premium amounts less than the standard annual deferred premium amount assessed under paragraph (1)—

"(i) for any facility, if more than one nuclear incident occurs in any one calendar year; or

"(ii) for any licensee licensed to operate more than one facility, if the Commission determines that the financial impact of assessing the standard annual deferred premium amount under paragraph (1) would result in undue financial hardship to such licensee or the ratepayers of such licensee.

"(B) In the event that the Commission assesses a lesser annual deferred premium amount under subparagraph (A), the Commission shall require payment of the difference between the standard annual deferred premium assessment under paragraph (1) and any such lesser annual deferred premium assessment within a reasonable period of time, with interest at a rate determined by the Secretary of the Treasury on the basis of the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the date that the standard annual deferred premium assessment under paragraph (1) would become due."

(d) BORROWING AUTHORITY.—Section 170 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(b)) is amended—

(i) by inserting "(3)" before the penultimate sentence and redesignating the penultimate and last sentences as a paragraph (3); and

(2) by adding at the end the following new paragraph:

"(4)(A) In the event that the funds available to pay valid claims in any year are insufficient as a result of the limitation on the amount of deferred premiums that may be required of a licensee in any year under paragraph (1) or (2), or the Commission is required to make reinsurance or guaranteed payments under paragraph (3), the Commission shall, in order to advance the necessary funds—

Claims.

"(i) request the Congress to appropriate sufficient funds to satisfy such payments; or

"(ii) to the extent approved in appropriation Acts, issue to the Secretary of the Treasury obligations in such forms and denominations, bearing such maturities, and subject to such terms and conditions as may be agreed to by the Commission and the Secretary of the Treasury.

"(B) Except for funds appropriated for purposes of making reinsurance or guaranteed payments under paragraph (3), any funds appropriated under subparagraph (A)(i) shall be repaid to the general fund of the United States Treasury from amounts made available by standard deferred premium assessments, with interest at a rate determined by the Secretary of the Treasury on the basis of the current average market yield on outstanding marketable obligations of the United States of comparable maturities during the month preceding the date that the funds appropriated under such subparagraph are made available.

"(C) Except for funds appropriated for purposes of making reinsurance or guaranteed payments under paragraph (3), redemption of obligations issued under subparagraph (A)(ii) shall be made by the Commission from amounts made available by standard deferred premium assessments. Such obligations shall bear interest at a rate determined by the Secretary of the Treasury by taking into consideration the average market yield on outstanding marketable obliga-

Securities. tions to the United States of comparable maturities during the month preceding the issuance of the obligations under this paragraph. The Secretary of the Treasury shall purchase any issued obligations, and for such purpose the Secretary of the Treasury may use as a public debt transaction the proceeds from the sale of any securities issued under chapter 31 of title 31, United States Code, and the purposes for which securities may be issued under such chapter are extended to include any purchase of such obligations. The Secretary of the Treasury may at any time sell any of the obligations acquired by the Secretary of the Treasury under this paragraph. All redemptions, purchases, and sales by the Secretary of the Treasury of obligations under this paragraph shall be treated as public debt transactions of the United States."

SEC. 3. INDEMNIFICATION AGREEMENTS FOR LICENSEES OF NUCLEAR REGULATORY COMMISSION.

Section 170 c. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(c)) is amended by striking "August 1, 1987" each place it appears and inserting "August 1, 2002".

SEC. 4. INDEMNIFICATION AGREEMENTS FOR ACTIVITIES UNDERTAKEN UNDER CONTRACT WITH DEPARTMENT OF ENERGY.

(a) IN GENERAL.—Section 170 d. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(d)) is amended to read as follows:

Termination
date.

"d. INDEMNIFICATION OF CONTRACTORS BY DEPARTMENT OF ENERGY.—(1)(A) In addition to any other authority the Secretary of Energy (in this section referred to as the 'Secretary') may have, the Secretary shall, until August 1, 2002, enter into agreements of indemnification under this subsection with any person who may conduct activities under a contract with the Department of Energy that involve the risk of public liability and that are not subject to financial protection requirements under subsection b. or agreements of indemnification under subsection c. or k.

Effective date.

"(B)(i)(I) Beginning 60 days after the date of enactment of the Price-Anderson Amendments Act of 1988, agreements of indemnification under subparagraph (A) shall be the exclusive means of indemnification for public liability arising from activities described in such subparagraph, including activities conducted under a contract that contains an indemnification clause under Public Law 85-804 entered into between August 1, 1987, and the date of enactment of the Price-Anderson Amendments Act of 1988.

"(II) The Secretary may incorporate in agreements of indemnification under subparagraph (A) the provisions relating to the waiver of any issue or defense as to charitable or governmental immunity authorized in subsection n. (1) to be incorporated in agreements of indemnification. Any such provisions incorporated under this subclause shall apply to any nuclear incident arising out of nuclear waste activities subject to an agreement of indemnification under subparagraph (A).

"(ii) Public liability arising out of nuclear waste activities subject to an agreement of indemnification under subparagraph (A) that are funded by the Nuclear Waste Fund established in section 302 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10222) shall be compensated from the Nuclear Waste Fund in an amount not to exceed the maximum amount of financial protection required of licensees under subsection b.

"(2) In agreements of indemnification entered into under paragraph (1), the Secretary may require the contractor to provide and maintain financial protection of such a type and in such amounts as the Secretary shall determine to be appropriate to cover public liability arising out of or in connection with the contractual activity, and shall indemnify the persons indemnified against such claims above the amount of the financial protection required, to the full extent of the aggregate public liability of the persons indemnified for each nuclear incident, including such legal costs of the contractor as are approved by the Secretary.

Claims.

"(3)(A) Notwithstanding paragraph (2), if the maximum amount of financial protection required of licensees under subsection b. is increased by the Commission, the amount of indemnity, together with any financial protection required of the contractor, shall at all times remain equal to or greater than the maximum amount of financial protection required of licensees under subsection b.

"(B) The amount of indemnity provided contractors under this subsection shall not, at any time, be reduced in the event that the maximum amount of financial protection required of licensees is reduced.

"(C) All agreements of indemnification under which the Department of Energy (or its predecessor agencies) may be required to indemnify any person, shall be deemed to be amended, on the date of the enactment of the Price-Anderson Amendments Act of 1988, to reflect the amount of indemnity for public liability and any applicable financial protection required of the contractor under this subsection on such date.

Effective date.

"(4) Financial protection under paragraph (2) and indemnification under paragraph (1) shall be the exclusive means of financial protection and indemnification under this section for any Department of Energy demonstration reactor licensed by the Commission under section 202 of the Energy Reorganization Act of 1974 (42 U.S.C. 5842).

"(5) In the case of nuclear incidents occurring outside the United States, the amount of the indemnity provided by the Secretary under this subsection shall not exceed \$100,000,000.

"(6) The provisions of this subsection may be applicable to lump sum as well as cost type contracts and to contracts and projects financed in whole or in part by the Secretary.

"(7) A contractor with whom an agreement of indemnification has been executed under paragraph (1)(A) and who is engaged in activities connected with the underground detonation of a nuclear explosive device shall be liable, to the extent so indemnified under this subsection, for injuries or damage sustained as a result of such detonation in the same manner and to the same extent as would a private person acting as principal, and no immunity or defense founded in the Federal, State, or municipal character of the contractor or of the work to be performed under the contract shall be effective to bar such liability."

(b) DEFINITIONS.—Section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014) is amended by adding at the end the following new subsections:

"dd. The terms 'high-level radioactive waste' and 'spent nuclear fuel' have the meanings given such terms in section 2 of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101).

"ee. The term 'transuranic waste' means material contaminated with elements that have an atomic number greater than 92, includ-

ing neptunium, plutonium, americium, and curium, and that are in concentrations greater than 10 nanocuries per gram, or in such other concentrations as the Nuclear Regulatory Commission may prescribe to protect the public health and safety.

"ff. The term 'nuclear waste activities', as used in section 170, means activities subject to an agreement of indemnification under subsection d. of such section, that the Secretary of Energy is authorized to undertake, under this Act or any other law, involving the storage, handling, transportation, treatment, or disposal of, or research and development on, spent nuclear fuel, high-level radioactive waste, or transuranic waste, including (but not limited to) activities authorized to be carried out under the Waste Isolation Pilot Project under section 213 of Public Law 96-164 (93 Stat. 1265)."

SEC. 5. PRECAUTIONARY EVACUATIONS.

(a) COSTS INCURRED BY STATE GOVERNMENTS.—Section 11 w. of the Atomic Energy Act of 1954 (42 U.S.C. 2014(w)) is amended by inserting after "nuclear incident" the first place it appears the following: "or precautionary evacuation (including all reasonable additional costs incurred by a State, or a political subdivision of a State, in the course of responding to a nuclear incident or a precautionary evacuation)".

(b) DEFINITION.—Section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"gg. The term 'precautionary evacuation' means an evacuation of the public within a specified area near a nuclear facility, or the transportation route in the case of an accident involving transportation of source material, special nuclear material, byproduct material, high-level radioactive waste, spent nuclear fuel, or transuranic waste to or from a production or utilization facility, if the evacuation is—

"(1) the result of any event that is not classified as a nuclear incident but that poses imminent danger of bodily injury or property damage from the radiological properties of source material, special nuclear material, byproduct material, high-level radioactive waste, spent nuclear fuel, or transuranic waste, and causes an evacuation; and

"(2) initiated by an official of a State or a political subdivision of a State, who is authorized by State law to initiate such an evacuation and who reasonably determined that such an evacuation was necessary to protect the public health and safety."

(c) LIMITATION.—Section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) is amended by adding at the end the following new subsection:

"q. LIMITATION ON AWARDING OF PRECAUTIONARY EVACUATION COSTS.—No court may award costs of a precautionary evacuation unless such costs constitute a public liability."

Courts, U.S.

SEC. 6. AGGREGATE PUBLIC LIABILITY FOR SINGLE NUCLEAR INCIDENT.

Section 170 e. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(e)) is amended to read as follows:

"e. LIMITATION ON AGGREGATE PUBLIC LIABILITY.—(1) The aggregate public liability for a single nuclear incident of persons indemnified, including such legal costs as are authorized to be paid under subsection o. (1)(D), shall not exceed—

"(A) in the case of facilities designed for producing substantial amounts of electricity and having a rated capacity of 100,000 electrical kilowatts or more, the maximum amount of financial protection required of such facilities under subsection b. (plus any surcharge assessed under subsection o. (1)(E));

"(B) in the case of contractors with whom the Secretary has entered into an agreement of indemnification under subsection d., the maximum amount of financial protection required under subsection b. or the amount of indemnity and financial protection that may be required under paragraph (3) of subsection d., whichever amount is more; and

"(C) in the case of all other licensees of the Commission required to maintain financial protection under this section—

"(i) \$500,000,000, together with the amount of financial protection required of the licensee; or

"(ii) if the amount of financial protection required of the licensee exceeds \$60,000,000, \$560,000,000 or the amount of financial protection required of the licensee, whichever amount is more.

"(2) In the event of a nuclear incident involving damages in excess of the amount of aggregate public liability under paragraph (1), the Congress will thoroughly review the particular incident in accordance with the procedures set forth in section 170 i. and will in accordance with such procedures, take whatever action is determined to be necessary (including approval of appropriate compensation plans and appropriation of funds) to provide full and prompt compensation to the public for all public liability claims resulting from a disaster of such magnitude.

"(3) No provision of paragraph (1) may be construed to preclude the Congress from enacting a revenue measure, applicable to licensees of the Commission required to maintain financial protection pursuant to subsection b., to fund any action undertaken pursuant to paragraph (2).

"(4) With respect to any nuclear incident occurring outside of the United States to which an agreement of indemnification entered into under the provisions of subsection d. is applicable, such aggregate public liability shall not exceed the amount of \$100,000,000, together with the amount of financial protection required of the contractor."

SEC. 7. COMPENSATION PLANS.

(a) IN GENERAL.—Section 170 i. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(i)) is amended to read as follows:

"i. COMPENSATION PLANS.—(1) After any nuclear incident involving damages that are likely to exceed the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1), the Secretary or the Commission, as appropriate, shall—

"(A) make a survey of the causes and extent of damage; and

"(B) expeditiously submit a report setting forth the results of such survey to the Congress, to the Representatives of the affected districts, to the Senators of the affected States, and (except for information that will cause serious damage to the national defense of the United States) to the public, to the parties involved, and to the courts.

"(2) Not later than 90 days after any determination by a court, pursuant to subsection o., that the public liability from a single

Contracts.

Claims.

Contracts.

Reports.
Defense and
national
security.

President of U.S.

nuclear incident may exceed the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1) the President shall submit to the Congress—

“(A) an estimate of the aggregate dollar value of personal injuries and property damage that arises from the nuclear incident and exceeds the amount of aggregate public liability under subsection e. (1);

Claims.

“(B) recommendations for additional sources of funds to pay claims exceeding the applicable amount of aggregate public liability under subparagraph (A), (B), or (C) of subsection e. (1), which recommendations shall consider a broad range of possible sources of funds (including possible revenue measures on the sector of the economy, or on any other class, to which such revenue measures might be applied);

Claims.

“(C) 1 or more compensation plans, that either individually or collectively shall provide for full and prompt compensation for all valid claims and contain a recommendation or recommendations as to the relief to be provided, including any recommendations that funds be allocated or set aside for the payment of claims that may arise as a result of latent injuries that may not be discovered until a later date; and

“(D) any additional legislative authorities necessary to implement such compensation plan or plans.

“(3)(A) Any compensation plan transmitted to the Congress pursuant to paragraph (2) shall bear an identification number and shall be transmitted to both Houses of Congress on the same day and to each House while it is in session.

“(B) The provisions of paragraphs (4) through (6) shall apply with respect to consideration in the Senate of any compensation plan transmitted to the Senate pursuant to paragraph (2).

“(4) No such compensation plan may be considered approved for purposes of subsection 170 e. (2) unless between the date of transmittal and the end of the first period of sixty calendar days of continuous session of Congress after the date on which such action is transmitted to the Senate, the Senate passes a resolution described in paragraph 6 of this subsection.

“(5) For the purpose of paragraph (4) of this subsection—

“(A) continuity of session is broken only by an adjournment of Congress sine die; and

“(B) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of the sixty-day calendar period.

“(6)(A) This paragraph is enacted—

“(i) as an exercise of the rulemaking power of the Senate and as such it is deemed a part of the rules of the Senate, but applicable only with respect to the procedure to be followed in the Senate in the case of resolutions described by subparagraph (B) and it supersedes other rules only to the extent that it is inconsistent therewith; and

“(ii) with full recognition of the constitutional right of the Senate to change the rules at any time, in the same manner and to the same extent as in the case of any other rule of the Senate.

“(B) For purposes of this paragraph, the term ‘resolution’ means only a joint resolution of the Congress the matter after the resolving clause of which is as follows: ‘That the _____ approves the compensation plan numbered _____ submitted to the Congress on _____, 19 __, the first blank space therein being

filled with the name of the resolving House and the other blank spaces being appropriately filled; but does not include a resolution which specifies more than one compensation plan.

"(C) A resolution once introduced with respect to a compensation plan shall immediately be referred to a committee (and all resolutions with respect to the same compensation plan shall be referred to the same committee) by the President of the Senate.

"(D)(i) If the committee of the Senate to which a resolution with respect to a compensation plan has been referred has not reported it at the end of twenty calendar days after its referral, it shall be in order to move either to discharge the committee from further consideration of such resolution or to discharge the committee from further consideration with respect to such compensation plan which has been referred to the committee.

"(ii) A motion to discharge may be made only by an individual favoring the resolution, shall be highly privileged (except that it may not be made after the committee has reported a resolution with respect to the same compensation plan), and debate thereon shall be limited to not more than one hour, to be divided equally between those favoring and those opposing the resolution. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

"(iii) If the motion to discharge is agreed to or disagreed to, the motion may not be renewed, nor may another motion to discharge the committee be made with respect to any other resolution with respect to the same compensation plan.

"(E)(i) When the committee has reported, or has been discharged from further consideration of, a resolution, it shall be at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) to move to proceed to the consideration of the resolution. The motion shall be highly privileged and shall not be debatable. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

"(ii) Debate on the resolution referred to in clause (i) of this subparagraph shall be limited to not more than ten hours, which shall be divided equally between those favoring and those opposing such resolution. A motion further to limit debate shall not be debatable. An amendment to, or motion to recommit, the resolution shall not be in order, and it shall not be in order to move to reconsider the vote by which such resolution was agreed to or disagreed to.

"(F)(i) Motions to postpone, made with respect to the discharge from committee, or the consideration of a resolution or motions to proceed to the consideration of other business, shall be decided without debate.

"(ii) Appeals from the decision of the Chair relating to the application of the rules of the Senate to the procedures relating to a resolution shall be decided without debate."

(b) CONFORMING AMENDMENT.—Section 170 o. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(o)) is amended—

(1) in the matter preceding paragraph (1), by striking "subsection 170 e.:" and inserting "the applicable limit of liability under subparagraph (A), (B), or (C) of subsection e. (1):"; and

(2) by striking paragraph (4).

SEC. 8. DATE OF EXEMPTION FROM FINANCIAL PROTECTION REQUIREMENT.

Section 170 k. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(k)) is amended—

(1) by striking "August 1, 1987" each place it appears and inserting "August 1, 2002"; and

(2) by striking "excluding cost of investigating and settling claims and defending suits for damage;" in paragraph (1) and inserting "including such legal costs of the licensee as are approved by the Commission;"

SEC. 9. PRESIDENTIAL COMMISSION ON CATASTROPHIC NUCLEAR ACCIDENTS.

Section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) is amended by striking subsection 1. and inserting the following:

"(1) **PRESIDENTIAL COMMISSION ON CATASTROPHIC NUCLEAR ACCIDENTS.**—(1) Not later than 90 days after the date of the enactment of the Price-Anderson Amendments Act of 1988, the President shall establish a commission (in this subsection referred to as the 'study commission') in accordance with the Federal Advisory Committee Act (5 U.S.C. App.) to study means of fully compensating victims of a catastrophic nuclear accident that exceeds the amount of aggregate public liability under subsection e. (1).

"(2)(A) The study commission shall consist of not less than 7 and not more than 11 members, who—

"(i) shall be appointed by the President; and

"(ii) shall be representative of a broad range of views and interests.

"(B) The members of the study commission shall be appointed in a manner that ensures that not more than a mere majority of the members are of the same political party.

"(C) Each member of the study commission shall hold office until the termination of the study commission, but may be removed by the President for inefficiency, neglect of duty, or malfeasance in office.

"(D) Any vacancy in the study commission shall be filled in the manner in which the original appointment was made.

"(E) The President shall designate one of the members of the study commission as chairperson, to serve at the pleasure of the President.

"(3) The study commission shall conduct a comprehensive study of appropriate means of fully compensating victims of a catastrophic nuclear accident that exceeds the amount of aggregate public liability under subsection e. (1), and shall submit to the Congress a final report setting forth—

"(A) recommendations for any changes in the laws and rules governing the liability or civil procedures that are necessary for the equitable, prompt, and efficient resolution and payment of all valid damage claims, including the advisability of adjudicating public liability claims through an administrative agency instead of the judicial system;

"(B) recommendations for any standards or procedures that are necessary to establish priorities for the hearing, resolution, and payment of claims when awards are likely to exceed the amount of funds available within a specific time period; and

Reports.

"(C) recommendations for any special standards or procedures necessary to decide and pay claims for latent injuries caused by the nuclear incident.

"(4)(A) The chairperson of the study commission may appoint and fix the compensation of a staff of such persons as may be necessary to discharge the responsibilities of the study commission, subject to the applicable provisions of the Federal Advisory Committee Act (5 U.S.C. App.) and title 5, United States Code.

"(B) To the extent permitted by law and requested by the chairperson of the study commission, the Administrator of General Services shall provide the study commission with necessary administrative services, facilities, and support on a reimbursable basis.

"(C) The Attorney General, the Secretary of Health and Human Services, and the Director of the Federal Emergency Management Agency shall, to the extent permitted by law and subject to the availability of funds, provide the study commission with such facilities, support, funds and services, including staff, as may be necessary for the effective performance of the functions of the study commission.

"(D) The study commission may request any Executive agency to furnish such information, advice, or assistance as it determines to be necessary to carry out its functions. Each such agency is directed, to the extent permitted by law, to furnish such information, advice or assistance upon request by the chairperson of the study commission.

"(E) Each member of the study commission may receive compensation at the maximum rate prescribed by the Federal Advisory Committee Act (5 U.S.C. App.) for each day such member is engaged in the work of the study commission. Each member may also receive travel expenses, including per diem in lieu of subsistence under sections 5702 and 5703 of title 5, United States Code.

"(F) The functions of the President under the Federal Advisory Committee Act (5 U.S.C. App.) that are applicable to the study commission, except the function of reporting annually to the Congress, shall be performed by the Administrator of General Services.

"(5) The final report required in paragraph (3) shall be submitted to the Congress not later than the expiration of the 2-year period beginning on the date of the enactment of the Price-Anderson Amendments Act of 1988.

"(6) The study commission shall terminate upon the expiration of the 2-month period beginning on the date on which the final report required in paragraph (3) is submitted."

Reports.

Termination date.

SEC. 10. WAIVER OF DEFENSES.

(a) **STATUTE OF LIMITATIONS.**—Section 170 n. (1) of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)(1)) is amended in clause (iii) of the first sentence by striking the following: ", but in no event more than twenty years after the date of the nuclear incident".

(b) **APPLICABILITY.**—Section 170 n. (1) of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)(1)) is amended—

(1) by redesignating subparagraphs (a), (b), and (c) as subparagraphs (A), (B), and (C), respectively;

(2) by striking "or" at the end of subparagraphs (A) and (B); and

(3) by inserting after subparagraph (C) the following new subparagraphs:

"(D) arises out of, results from, or occurs in the course of, the construction, possession, or operation of any facility licensed

under section 53, 63, or 81, for which the Commission has imposed as a condition of the license a requirement that the licensee have and maintain financial protection under subsection a.,

"(E) arises out of, results from, or occurs in the course of, transportation of source material, byproduct material, or special nuclear material to or from any facility licensed under section 53, 63, or 81, for which the Commission has imposed as a condition of the license a requirement that the licensee have and maintain financial protection under subsection a., or

"(F) arises out of, results from, or occurs in the course of nuclear waste activities."

SEC. 11. JUDICIAL REVIEW OF CLAIMS ARISING OUT OF A NUCLEAR INCIDENT.

(a) **CONSOLIDATION OF CLAIMS.**—Section 170 n. (2) of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)(2)) is amended—

(1) in the first sentence—

(A) by striking "an extraordinary nuclear occurrence" each place it appears and inserting "a nuclear incident"; and

(B) by striking "the extraordinary nuclear occurrence" each place it appears and inserting "the nuclear incident";

(2) in the second sentence, by inserting after "court" the first place it appears the following: "(including any such action pending on the date of the enactment of the Price-Anderson Amendments Act of 1988)"; and

(3) by adding at the end the following new sentence: "In any action that is or becomes removable pursuant to this paragraph, a petition for removal shall be filed within the period provided in section 1446 of title 28, United States Code, or within the 30-day period beginning on the date of the enactment of the Price-Anderson Amendments Act of 1988, whichever occurs later."

(b) **DEFINITION OF PUBLIC LIABILITY ACTION.**—Section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"hh. The term 'public liability action', as used in section 170, means any suit asserting public liability. A public liability action shall be deemed to be an action arising under section 170, and the substantive rules for decision in such action shall be derived from the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent with the provisions of such section."

(c) **SPECIAL CASELOAD MANAGEMENT PANEL.**—Section 170 n. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)) is amended by adding at the end the following new paragraph:

"(3)(A) Following any nuclear incident, the chief judge of the United States district court having jurisdiction under paragraph (2) with respect to public liability actions (or the judicial council of the judicial circuit in which the nuclear incident occurs) may appoint a special caseload management panel (in this paragraph referred to as the 'management panel') to coordinate and assign (but not necessarily hear themselves) cases arising out of the nuclear incident, if—

"(i) a court, acting pursuant to subsection o., determines that the aggregate amount of public liability is likely to exceed the

amount of primary financial protection available under subsection b. (or an equivalent amount in the case of a contractor indemnified under subsection d.); or

"(ii) the chief judge of the United States district court (or the judicial council of the judicial circuit) determines that cases arising out of the nuclear incident will have an unusual impact on the work of the court.

"(B)(i) Each management panel shall consist only of members who are United States district judges or circuit judges.

"(ii) Members of a management panel may include any United States district judge or circuit judge of another district court or court of appeals, if the chief judge of such other district court or court of appeals consents to such assignment.

"(C) It shall be the function of each management panel—

"(i) to consolidate related or similar claims for hearing or trial;

"(ii) to establish priorities for the handling of different classes of cases;

"(iii) to assign cases to a particular judge or special master;

"(iv) to appoint special masters to hear particular types of cases, or particular elements or procedural steps of cases;

"(v) to promulgate special rules of court, not inconsistent with the Federal Rules of Civil Procedure, to expedite cases or allow more equitable consideration of claims;

"(vi) to implement such other measures, consistent with existing law and the Federal Rules of Civil Procedure, as will encourage the equitable, prompt, and efficient resolution of cases arising out of the nuclear incident; and

"(vii) to assemble and submit to the President such data, available to the court, as may be useful in estimating the aggregate damages from the nuclear incident."

(d) LEGAL COSTS.—

(1) PAYMENT CRITERIA.—Section 170 o. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(o)), as previously amended by this Act, is further amended by—

(A) inserting after the subsection designation the following: "PLAN FOR DISTRIBUTION OF FUNDS.—(1)";

(B) redesignating paragraphs (1) through (3) as subparagraphs (A) through (C); and

(C) adding at the end the following:

"(D) A court may authorize payment of only such legal costs as are permitted under paragraph (2) from the amount of financial protection required by subsection b.

"(E) If the sum of public liability claims and legal costs authorized under paragraph (2) arising from any nuclear incident exceeds the maximum amount of financial protection required under subsection b., any licensee required to pay a standard deferred premium under subsection b. (1) shall, in addition to such deferred premium, be charged such an amount as is necessary to pay a pro rata share of such claims and costs, but in no case more than 5 percent of the maximum amount of such standard deferred premium described in such subsection.

"(2) A court may authorize the payment of legal costs under paragraph (1)(D) only if the person requesting such payment has—

"(A) submitted to the court the amount of such payment requested; and

"(B) demonstrated to the court—

Courts, U.S.

"(i) that such costs are reasonable and equitable; and
 "(ii) that such person has—

"(I) litigated in good faith;

"(II) avoided unnecessary duplication of effort with that of other parties similarly situated;

"(III) not made frivolous claims or defenses; and

"(IV) not attempted to unreasonably delay the prompt settlement or adjudication of such claims."

(2) **DEFINITION OF LEGAL COSTS.**—Section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"j. **LEGAL COSTS.**—As used in section 170, the term 'legal costs' means the costs incurred by a plaintiff or a defendant in initiating, prosecuting, investigating, settling, or defending claims or suits for damage arising under such section."

SEC. 12. REPORTS TO CONGRESS BY NUCLEAR REGULATORY COMMISSION AND DEPARTMENT OF ENERGY.

Section 170 p. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(p)) is amended—

(1) by inserting "(1)" after the subsection designation;

(2) by striking "shall submit to the Congress by August 1, 1983, a detailed report", and inserting the following: "and the Secretary shall submit to the Congress by August 1, 1998, detailed reports"; and

(3) by adding at the end the following new paragraph:

"(2) Not later than April 1 of each year, the Commission and the Secretary shall each submit an annual report to the Congress setting forth the activities under this section during the preceding calendar year."

SEC. 13. LIABILITY OF LESSORS.

Section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"r. **LIMITATION ON LIABILITY OF LESSORS.**—No person under a bona fide lease of any utilization or production facility (or part thereof or undivided interest therein) shall be liable by reason of an interest as lessor of such production or utilization facility, for any legal liability arising out of or resulting from a nuclear incident resulting from such facility, unless such facility is in the actual possession and control of such person at the time of the nuclear incident giving rise to such legal liability."

SEC. 14. PUNITIVE DAMAGES.

Section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"s. **LIMITATION ON PUNITIVE DAMAGES.**—No court may award punitive damages in any action with respect to a nuclear incident or precautionary evacuation against a person on behalf of whom the United States is obligated to make payments under an agreement of indemnification covering such incident or evacuation."

SEC. 15. INFLATION ADJUSTMENT.

Section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210), as previously amended by this Act, is further amended by adding at the end the following new subsection:

"t. INFLATION ADJUSTMENT.—(1) The Commission shall adjust the amount of the maximum standard deferred premium under subsection b. (1) not less than once during each 5-year period following the date of the enactment of the Price-Anderson Amendments Act of 1988, in accordance with the aggregate percentage change in the Consumer Price Index since—

"(A) such date of enactment, in the case of the first adjustment under this subsection; or

"(B) the previous adjustment under this subsection.

"(2) For purposes of this subsection, the term 'Consumer Price Index' means the Consumer Price Index for all urban consumers published by the Secretary of Labor."

SEC. 16. TECHNICAL AND CONFORMING AMENDMENTS.**(a) REFERENCES TO NUCLEAR REGULATORY COMMISSION.—**

(1) Section 11 q. of the Atomic Energy Act of 1954 (42 U.S.C. 2014(q)) is amended by striking "Commission" each place it appears and inserting "Nuclear Regulatory Commission".

(2) Section 170 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(a)) is amended by striking "Commission" in the first sentence and inserting the following: "Nuclear Regulatory Commission (in this section referred to as the 'Commission')".

(b) REFERENCES TO SECRETARY OF ENERGY.—

(1) Subsections j. and m. of section 11 of the Atomic Energy Act of 1954 (42 U.S.C. 2014) are amended by striking "Commission" each place it appears and inserting the following: "Nuclear Regulatory Commission or the Secretary of Energy, as appropriate,".

(2) Section 11 t. (2) of the Atomic Energy Act of 1954 (42 U.S.C. 2014(t)(2)) is amended by striking "Commission" and inserting "Secretary of Energy".

(3) Section 170 f. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(f)) is amended by inserting after "Commission" the first 2 places it appears the following: "or the Secretary, as appropriate,".

(4) Subsections g., h., j., and m. of section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) are amended by inserting after "Commission" each place it appears the following: "or the Secretary, as appropriate,".

(5) Section 170 n. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)) is amended—

(A) in paragraph (1)—

(i) by striking "Commission" in subparagraph (C) and inserting "Department of Energy"; and

(ii) by inserting after "Commission" the second place it appears the following: "or the Secretary, as appropriate,"; and

(B) in paragraph (2), by inserting after "Commission" the following: "or the Secretary, as appropriate".

(6) Section 170 o. (1)(C), as redesignated by section 11(d)(1) of the bill, is amended—

(A) by inserting after "Commission" the first place it appears the following: "or the Secretary, as appropriate,"; and

(B) by inserting after "Commission" the second place it appears the following: "or the Secretary as appropriate".

(c) REFERENCES TO REVISED STATUTES.—

(1) Section 170 g. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(g)) is amended by inserting "(41 U.S.C. 5)" after "Statutes".

(2) Section 170 j. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(j)) is amended by striking "section 3679 of the Revised Statutes, as amended" and inserting the following: "sections 1341, 1342, 1349, 1350, and 1351, and subchapter II of chapter 15, of title 31, United States Code".

(d) INTERNAL CROSS-REFERENCES.—

(1) Section 11 q. of the Atomic Energy Act of 1954 (42 U.S.C. 2014(q)) is amended by striking "subsection each place it appears and inserting "section".

(2) Section 11 t. of the Atomic Energy Act of 1954 (42 U.S.C. 2014(t)) is amended by striking "subsection" each place it appears and inserting "section".

(3) Section 11 w. of the Atomic Energy Act of 1954 (42 U.S.C. 2014(w)) is amended by striking "subsections 170 a., c., and k." and inserting "subsections a., c., and k. of section 170".

(4) Section 170 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2010(a)) is amended—

(A) in the first sentence, by striking "subsection 2 i. of the Atomic Energy Act of 1954, as amended" and inserting "section 2 i.";

(B) in the first sentence, by striking "subsection 170 b." and inserting "subsection b."; and

(C) in the second sentence, by striking "subsection 170 c." and inserting "subsection c.".

(5) Section 170 k. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(k)) is amended in the first sentence by striking "subsection 170 a." and inserting "subsection a.".

(6) Section 170 n. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)(1)) is amended in the last sentence by striking "subsection 170 e." and inserting "subsection e.".

(7) Section 170 o. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(o)) is amended in subparagraph (B), as redesignated by section 11(d)(1) of the bill, by striking "subparagraph (3) of this subsection (o)" and inserting "subparagraph (C)".

(e) SUBSECTION CAPTIONS.—

(1) Section 170 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(a)) is amended by inserting after the subsection designation the following: "REQUIREMENT OF FINANCIAL PROTECTION FOR LICENSEES.—".

(2) Section 170 b. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(b)) is amended by inserting after the subsection designation the following: "AMOUNT AND TYPE OF FINANCIAL PROTECTION FOR LICENSEES.—".

(3) Section 170 c. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(c)) is amended by inserting after the subsection designation the following: "INDEMNIFICATION OF LICENSES BY NUCLEAR REGULATORY COMMISSION.—".

(4) Section 170 f. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(f)) is amended by inserting after the subsection designation

the following: "COLLECTION OF FEES BY NUCLEAR REGULATORY COMMISSION.—".

(5) Section 170 g. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(g)) is amended by inserting after the subsection designation the following: "USE OF SERVICES OF PRIVATE INSURERS.—".

(6) Section 170 h. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(h)) is amended by inserting after the subsection designation the following: "CONDITIONS OF AGREEMENTS OF INDEMNIFICATION.—".

(7) Section 170 j. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(j)) is amended by inserting after the subsection designation the following: "CONTRACTS IN ADVANCE OF APPROPRIATIONS.—".

(8) Section 170 k. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(k)) is amended by inserting after the subsection designation the following: "EXEMPTION FROM FINANCIAL PROTECTION REQUIREMENT FOR NONPROFIT EDUCATIONAL INSTITUTIONS.—".

(9) Section 170 m. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(m)) is amended by inserting after the subsection designation the following: "COORDINATED PROCEDURES FOR PROMPT SETTLEMENT OF CLAIMS AND EMERGENCY ASSISTANCE.—".

(10) Section 170 n. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(n)) is amended by inserting after the subsection designation the following: "WAIVER OF DEFENSES AND JUDICIAL PROCEDURES.—".

(11) Section 170 p. of the Atomic Energy Act of 1954 (42 U.S.C. 2210(p)) is amended by inserting after the subsection designation the following: "REPORTS TO CONGRESS.—".

SEC. 17. CIVIL PENALTIES.

The Atomic Energy Act of 1954, as amended, is further amended by adding a new section 234A as follows:

"SEC. 234A. CIVIL MONETARY PENALTIES FOR VIOLATIONS OF DEPARTMENT OF ENERGY REGULATIONS.—a. Any person who has entered into an agreement of indemnification under subsection 170 d. (or any subcontractor or supplier thereto) who violates (or whose employee violates) any applicable rule, regulation or order related to nuclear safety prescribed or issued by the Secretary of Energy pursuant to this Act (or expressly incorporated by reference by the Secretary for purposes of nuclear safety, except any rule, regulation, or order issued by the Secretary of Transportation) shall be subject to a civil penalty of not to exceed \$100,000 for each such violation. If any violation under this subsection is a continuing one, each day of such violation shall constitute a separate violation for the purpose of computing the applicable civil penalty.

"b. (1) The Secretary shall have the power to compromise, modify or remit, with or without conditions, such civil penalties and to prescribe regulations as he may deem necessary to implement this section.

"(2) In determining the amount of any civil penalty under this subsection, the Secretary shall take into account the nature, circumstances, extent, and gravity of the violation or violations and, with respect to the violator, ability to pay, effect on ability to continue to do business, any history of prior such violations, the degree of culpability, and such other matters as justice may require. In implementing this section, the Secretary shall determine by rule whether nonprofit educational institutions should receive automatic remission of any penalty under this section.

42 USC 2282a.
Contracts.

"c. (1) Before issuing an order assessing a civil penalty against any person under this section, the Secretary shall provide to such person notice of the proposed penalty. Such notice shall inform such person of his opportunity to elect in writing within thirty days after the date of receipt of such notice to have the procedures of paragraph (3) (in lieu of those of paragraph (2)) apply with respect to such assessment.

"(2)(A) Unless an election is made within thirty calendar days after receipt of notice under paragraph (1) to have paragraph (3) apply with respect to such penalty, the Secretary shall assess the penalty, by order, after a determination of violation has been made on the record after an opportunity for an agency hearing pursuant to section 554 of title 5, United States Code, before an administrative law judge appointed under section 3105 of such title 5. Such assessment order shall include the administrative law judge's findings and the basis for such assessment.

Courts, U.S.

"(B) Any person against whom a penalty is assessed under this paragraph may, within sixty calendar days after the date of the order of the Secretary assessing such penalty, institute an action in the United States court of appeals for the appropriate judicial circuit for judicial review of such order in accordance with chapter 7 of title 5, United States Code. The court shall have jurisdiction to enter a judgment affirming, modifying, or setting aside in whole or in part, the order of the Secretary, or the court may remand the proceeding to the Secretary for such further action as the court may direct.

"(3)(A) In the case of any civil penalty with respect to which the procedures of this paragraph have been elected, the Secretary shall promptly assess such penalty, by order, after the date of the election under paragraph (1).

Courts, U.S.

"(B) If the civil penalty has not been paid within sixty calendar days after the assessment order has been made under subparagraph (A), the Secretary shall institute an action in the appropriate district court of the United States for an order affirming the assessment of the civil penalty. The court shall have authority to review de novo the law and facts involved, and shall have jurisdiction to enter a judgment enforcing, modifying, and enforcing as so modified, or setting aside in whole or in part, such assessment.

"(C) Any election to have this paragraph apply may not be revoked except with consent of the Secretary.

Courts, U.S.

"(4) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order under paragraph (2), or after the appropriate district court has entered final judgment in favor of the Secretary under paragraph (3), the Secretary shall institute an action to recover the amount of such penalty in any appropriate district court of the United States. In such action, the validity and appropriateness of such final assessment order or judgment shall not be subject to review.

Schools and
colleges.
Corporations.

"d. The provisions of this section shall not apply to:

"(1) The University of Chicago (and any subcontractors or suppliers thereto) for activities associated with Argonne National Laboratory;

"(2) The University of California (and any subcontractors or suppliers thereto) for activities associated with Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Lawrence Berkeley National Laboratory;

"(3) American Telephone and Telegraph Company and its subsidiaries (and any subcontractors or suppliers thereto) for activities associated with Sandia National Laboratories;

"(4) Universities Research Association, Inc. (and any subcontractors or suppliers thereto) for activities associated with FERMI National Laboratory;

"(5) Princeton University (and any subcontractors or suppliers thereto) for activities associated with Princeton Plasma Physics Laboratory;

"(6) The Associated Universities, Inc. (and any subcontractors or suppliers thereto) for activities associated with the Brookhaven National Laboratory; and

"(7) Battelle Memorial Institute (and any subcontractors or suppliers thereto) for activities associated with Pacific Northwest Laboratory."

SEC. 18. CRIMINAL PENALTIES.

Section 223 of the Atomic Energy Act of 1954, as amended, is further amended by adding a new subsection c. as follows:

42 USC 2273.

"c. Any individual director, officer or employee of a person indemnified under an agreement of indemnification under section 170 d. (or of a subcontractor or supplier thereto) who, by act or omission, knowingly and willfully violates or causes to be violated any section of this Act or any applicable nuclear safety-related rule, regulation or order issued thereunder by the Secretary of Energy (or expressly incorporated by reference by the Secretary for purposes of nuclear safety, except any rule, regulation, or order issued by the Secretary of Transportation), which violation results in or, if undetected, would have resulted in a nuclear incident as defined in subsection 11 q. shall, upon conviction, notwithstanding section 3571 of title 18, United States Code, be subject to a fine of not more than \$25,000, or to imprisonment not to exceed two years, or both. If the conviction is for a violation committed after the first conviction under this subsection, notwithstanding section 3571 of title 18, United States Code, punishment shall be a fine of not more than \$50,000, or imprisonment for not more than five years, or both."

Contracts.

SEC. 19. NEGOTIATED RULEMAKING ON FINANCIAL PROTECTION FOR RADIOPHARMACEUTICAL LICENSEES.

42 USC 2210 note.

(a) RULEMAKING PROCEEDING.—

Contracts.

(1) PURPOSE.—The Nuclear Regulatory Commission (hereafter in this section referred to as the "Commission") shall initiate a proceeding, in accordance with the requirements of this section, to determine whether to enter into indemnity agreements under section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) with persons licensed by the Commission under section 81, 104(a), or 104(c) of the Atomic Energy Act of 1954 (42 U.S.C. 2111, 2134(a), and 2134(c)) or by a State under section 274(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2021(b)) for the manufacture, production, possession, or use of radionuclides or radiopharmaceuticals for medical purposes (hereafter in this section referred to as "radiopharmaceutical licensees").

(2) FINAL DETERMINATION.—A final determination with respect to whether radiopharmaceutical licensees, or any class of such licensees, shall be indemnified pursuant to section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) and if so, the terms and conditions of such indemnification, shall be rendered

by the Commission within 18 months of the date of the enactment of this Act.

(b) NEGOTIATED RULEMAKING.—

(1) **ADMINISTRATIVE CONFERENCE GUIDELINES.**—For the purpose of making the determination required under subsection (a), the Commission shall, to the extent consistent with the provisions of this Act, conduct a negotiated rulemaking in accordance with the guidance provided by the Administrative Conference of the United States in Recommendation 82-4, "Procedures for Negotiating Proposed Regulations" (42 Fed. Reg. 30708, July 15, 1982).

(2) **DESIGNATION OF CONVENER.**—Within 30 days of the date of the enactment of this Act, the Commission shall designate an individual or individuals recommended by the Administrative Conference of the United States to serve as a convener for such negotiations.

Contracts.

(3) **SUBMISSION OF RECOMMENDATIONS OF THE CONVENER.**—The convener shall, not later than 7 months after the date of the enactment of this Act, submit to the Commission recommendations for a proposed rule regarding whether the Commission should enter into indemnity agreements under section 170 of the Atomic Energy Act of 1954 (42 U.S.C. 2210) with radiopharmaceutical licensees and, if so, the terms and conditions of such indemnification. If the convener recommends that such indemnity be provided for radiopharmaceutical licensees, the proposed rule submitted by the convener shall set forth the procedures for the execution of indemnification agreements with radiopharmaceutical licensees.

(4) **PUBLICATION OF RECOMMENDATIONS AND PROPOSED RULE.**—If the convener recommends that such indemnity be provided for radiopharmaceutical licensees, the Commission shall publish the recommendations of the convener submitted under paragraph (3) as a notice of proposed rulemaking within 30 days of the submission of such recommendations under such paragraph.

(5) **ADMINISTRATIVE PROCEDURES.**—To the extent consistent with the provisions of this Act, the Commission shall conduct the proceeding required under subsection (a) in accordance with section 553 of title 5, United States Code.

42 USC 2014
note.

SEC. 36. EFFECTIVE DATE.

(a) Except as provided in subsection (b), the amendments made by this Act shall become effective on the date of the enactment of this Act and shall be applicable with respect to nuclear incidents occurring on or after such date.

(b)(1) The amendments made by section 11 shall apply to nuclear incidents occurring before, on, or after the date of the enactment of this Act.

(2)(A) Section 234A of the Atomic Energy Act of 1954 shall not apply to any violation occurring before the date of the enactment of this Act.

(B) Section 223 c. of the Atomic Energy Act of 1954 shall not apply to any violation occurring before the date of enactment of this Act.

Approved August 20, 1988.

LEGISLATIVE HISTORY—H.R. 1414 (S. 748) (S. 1865):

HOUSE REPORTS: No. 100-104, Pt. 1 (Comm. on Interior and Insular Affairs), Pt. 2 (Comm. on Science, Space, and Technology), and Pt. 3 (Comm. on Energy and Commerce).

SENATE REPORTS: No. 100-70 accompanying S. 748 (Comm. on Energy and Natural Resources) and No. 100-218 accompanying S. 1865 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD:

Vol. 133 (1987): July 29, 30, considered and passed House.

Vol. 134 (1988): Mar. 16-18, considered and passed Senate, amended.

Aug. 2, House concurred in certain Senate amendment with an amendment and disagreed to others.

Aug. 5, Senate receded and concurred in House amendment.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 24 (1988):

Aug. 22, Presidential statement.

Public Law 100-418
100th Congress

An Act

To enhance the competitiveness of American industry, and for other purposes.

Aug. 23, 1988

[H.R. 4848]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE AND TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the "Omnibus Trade and Competitiveness Act of 1988".

(b) **TABLE OF CONTENTS.**—

Omnibus Trade and Competitiveness Act of 1988.
Exports.
Imports.
International agreements.
19 USC 2901 note.

TITLE V—FOREIGN CORRUPT PRACTICES AMENDMENTS, INVESTMENT, AND TECHNOLOGY

Subtitle B—Technology

PART I—TECHNOLOGY COMPETITIVENESS

Sec. 5101. Short title.

SUBPART A—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

Sec. 5111. Findings and purposes.

Sec. 5112. Establishment, functions, and activities.

Sec. 5113. Repeal of provisions.

Sec. 5114. Reports to Congress; studies by the National Academies of Engineering and Sciences.

Sec. 5115. Technical amendments

SUBPART B—TECHNOLOGY EXTENSION ACTIVITIES AND CLEARINGHOUSE ON STATE AND LOCAL INITIATIVES

Sec. 5121. Technology extension activities.

Sec. 5122. Clearinghouse on State and local initiatives.

SUBPART C—ADVANCED TECHNOLOGY PROGRAM

Sec. 5131. Advanced technology.

SUBPART D—TECHNOLOGY REVIEWS

Sec. 5141. Report of President.

Sec. 5142. Semiconductor research and development.

Sec. 5143. Review of research and development priorities in superconductors.

SUBPART E—AUTHORIZATION OF APPROPRIATIONS

Sec. 5151. Authorization of appropriations for technology activities.

Sec. 5152. Stevenson-Wydler Act authorizations.

SUBPART F—MISCELLANEOUS TECHNOLOGY AND COMMERCE PROVISIONS

Sec. 5161. Savings provision and user fees.

Sec. 5162. Miscellaneous amendments to the Stevenson-Wydler Act.

Sec. 5163. Miscellaneous technology and commerce provisions.

Sec. 5164. Metric usage.

PART II—SYMMETRICAL ACCESS TO TECHNOLOGICAL RESEARCH

Sec. 5171. Symmetrical access to technological research.

PART III—NATIONAL CRITICAL MATERIALS COUNCIL

Sec. 5181. The national Federal program plan for advanced materials research and development.

Sec. 5182. Personnel matters.

Sec. 5183. Authority to accept services and personnel from other Federal agencies.

Sec. 5184. Authorization of appropriations.

Subtitle C—Competitiveness Policy Council Act

Sec. 5201. Short title.

Sec. 5202. Findings and purposes.

Sec. 5203. Council established.

Sec. 5204. Dates of the Council.

Sec. 5205. Membership.

Sec. 5206. Executive Director and staff.

Sec. 5207. Powers of the Council.

Sec. 5208. Annual report.

Sec. 5209. Authorization of appropriations.

Sec. 5210. Definitions.

PART II—IMPACT STATEMENTS AND STUDIES

Sec. 5421. Competitiveness impact statements.

Sec. 5422. Study and report by the Advisory Council on Federal Participation in Research.

Subtitle E—National Science Foundation University Infrastructure

Sec. 6401. Short title.

Sec. 6402. National Science Foundation Academic Research Facilities Modernization Program.

Sec. 6403. National Science Foundation College Science Instrumentation Program.

TITLE V—FOREIGN CORRUPT PRACTICES AMENDMENTS; INVESTMENT; AND TECHNOLOGY

Subtitle B—Technology

Technology
Competitiveness
Act.
Research and
development.
15 USC 271 note.

PART I—TECHNOLOGY COMPETITIVENESS

SEC. 5101. SHORT TITLE.

This part may be cited as the "Technology Competitiveness Act".

Subpart A—National Institute of Standards and Technology

SEC. 5111. FINDINGS AND PURPOSES.

Section 1 of the Act of March 3, 1901 (15 U.S.C. 271) is amended to read as follows:

"FINDINGS AND PURPOSES

"SECTION 1. (a) The Congress finds and declares the following:

"(1) The future well-being of the United States economy depends on a strong manufacturing base and requires continual improvements in manufacturing technology, quality control, and techniques for ensuring product reliability and cost-effectiveness.

"(2) Precise measurements, calibrations, and standards help United States industry and manufacturing concerns compete strongly in world markets.

"(3) Improvements in manufacturing and product technology depend on fundamental scientific and engineering research to develop (A) the precise and accurate measurement methods and measurement standards needed to improve quality and reliability, and (B) new technological processes by which such improved methods may be used in practice to improve manufacturing and to assist industry to transfer important laboratory discoveries into commercial products.

"(4) Scientific progress, public safety, and product compatibility and standardization also depend on the development of precise measurement methods, standards, and related basic technologies.

"(5) The National Bureau of Standards since its establishment has served as the Federal focal point in developing basic measurement standards and related technologies, has taken a lead role in stimulating cooperative work among private industrial organizations in efforts to surmount technological hurdles, and otherwise has been responsible for assisting in the improvement of industrial technology.

"(6) The Federal Government should maintain a national science, engineering, and technology laboratory which provides measurement methods, standards, and associated technologies and which aids United States companies in using new technologies to improve products and manufacturing processes.

"(7) Such national laboratory also should serve industry, trade associations, State technology programs, labor organizations, professional societies, and educational institutions by disseminating information on new basic technologies including automated manufacturing processes.

"(b) It is the purpose of this Act—

"(1) to rename the National Bureau of Standards as the National Institute of Standards and Technology and to modernize and restructure that agency to augment its unique ability to enhance the competitiveness of American industry while maintaining its traditional function as lead national laboratory for providing the measurements, calibrations, and quality assurance techniques which underpin United States commerce, technological progress, improved product reliability and manufacturing processes, and public safety;

"(2) to assist private sector initiatives to capitalize on advanced technology;

"(3) to advance, through cooperative efforts among industries, universities, and government laboratories, promising research and development projects, which can be optimized by the private sector for commercial and industrial applications; and

"(4) to promote shared risks, accelerated development, and pooling of skills which will be necessary to strengthen America's manufacturing industries."

SEC. 5112. ESTABLISHMENT, FUNCTIONS, AND ACTIVITIES.

(a) ESTABLISHMENT, FUNCTIONS, AND ACTIVITIES OF THE INSTITUTE.—Section 2 of the Act of March 3, 1901 (15 U.S.C. 272) is amended to read as follows:

"ESTABLISHMENT, FUNCTIONS, AND ACTIVITIES

National
Institute of
Standards and
Technology.

"SEC. 2. (a) There is established within the Department of Commerce a science, engineering, technology, and measurement laboratory to be known as the National Institute of Standards and Technology (hereafter in this Act referred to as the 'Institute').

"(b) The Secretary of Commerce (hereafter in this Act referred to as the 'Secretary') acting through the Director of the Institute (hereafter in this Act referred to as the 'Director') and, if appropriate, through other officials, is authorized to take all actions necessary and appropriate to accomplish the purposes of this Act, including the following functions of the Institute—

"(1) to assist industry in the development of technology and procedures needed to improve quality, to modernize manufacturing processes, to ensure product reliability, manufacturability, functionality, and cost-effectiveness, and to facilitate the more rapid commercialization, especially by small- and medium-sized companies throughout the United States, of products based on new scientific discoveries in fields such as automation, electronics, advanced materials, biotechnology, and optical technologies;

"(2) to develop, maintain, and retain custody of the national standards of measurement, and provide the means and methods for making measurements consistent with those standards, including comparing standards used in scientific investigations, engineering, manufacturing, commerce, industry, and educational institutions with the standards adopted or recognized by the Federal Government;

"(3) to enter into contracts, including cooperative research and development arrangements, in furtherance of the purposes of this Act;

"(4) to provide United States industry, Government, and educational institutions with a national clearinghouse of current information, techniques, and advice for the achievement of higher quality and productivity based on current domestic and international scientific and technical development;

"(5) to assist industry in the development of measurements, measurement methods, and basic measurement technology;

"(6) to determine, compile, evaluate, and disseminate physical constants and the properties and performance of conventional and advanced materials when they are important to science,

engineering, manufacturing, education, commerce, and industry and are not available with sufficient accuracy elsewhere;

"(7) to develop a fundamental basis and methods for testing materials, mechanisms, structures, equipment, and systems, including those used by the Federal Government;

"(8) to assure the compatibility of United States national measurement standards with those of other nations;

"(9) to cooperate with other departments and agencies of the Federal Government, with industry, with State and local governments, with the governments of other nations and international organizations, and with private organizations in establishing standard practices, codes, specifications, and voluntary consensus standards;

"(10) to advise government and industry on scientific and technical problems; and

"(11) to invent, develop, and (when appropriate) promote transfer to the private sector of measurement devices to serve special national needs.

"(c) In carrying out the functions specified in subsection (b), the Secretary, acting through the Director and, if appropriate, through other appropriate officials, may, among other things—

"(1) construct physical standards;

"(2) test, calibrate, and certify standards and standard measuring apparatus;

"(3) study and improve instruments, measurement methods, and industrial process control and quality assurance techniques;

"(4) cooperate with the States in securing uniformity in weights and measures laws and methods of inspection;

"(5) cooperate with foreign scientific and technical institutions to understand technological developments in other countries better;

"(6) prepare, certify, and sell standard reference materials for use in ensuring the accuracy of chemical analyses and measurements of physical and other properties of materials;

"(7) in furtherance of the purposes of this Act, accept research associates, cash donations, and donated equipment from industry, and also engage with industry in research to develop new basic and generic technologies for traditional and new products and for improved production and manufacturing;

"(8) study and develop fundamental scientific understanding and improved measurement, analysis, synthesis, processing, and fabrication methods for chemical substances and compounds, ferrous and nonferrous metals, and all traditional and advanced materials, including processes of degradation;

"(9) investigate ionizing and nonionizing radiation and radioactive substances, their uses, and ways to protect people, structures, and equipment from their harmful effects;

"(10) determine the atomic and molecular structure of matter, through analysis of spectra and other methods, to provide a basis for predicting chemical and physical structures and reactions and for designing new materials and chemical substances, including biologically active macromolecules;

"(11) perform research on electromagnetic waves, including optical waves, and on properties and performance of electrical, electronic, and electromagnetic devices and systems and their essential materials, develop and maintain related standards,

and disseminate standard signals through broadcast and other means;

"(12) develop and test standard interfaces, communication protocols, and data structures for computer and related telecommunications systems;

"(13) study computer systems (as that term is defined in section 20(d) of this Act) and their use to control machinery and processes;

"(14) perform research to develop standards and test methods to advance the effective use of computers and related systems and to protect the information stored, processed, and transmitted by such systems and to provide advice in support of policies affecting Federal computer and related telecommunications systems;

"(15) determine properties of building materials and structural elements, and encourage their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;

"(16) undertake such research in engineering, pure and applied mathematics, statistics, computer science, materials science, and the physical sciences as may be necessary to carry out and support the functions specified in this section;

"(17) compile, evaluate, publish, and otherwise disseminate general, specific and technical data resulting from the performance of the functions specified in this section or from other sources when such data are important to science, engineering, or industry, or to the general public, and are not available elsewhere;

"(18) collect, create, analyze, and maintain specimens of scientific value;

"(19) operate national user facilities;

"(20) evaluate promising inventions and other novel technical concepts submitted by inventors and small companies and work with other Federal agencies, States, and localities to provide appropriate technical assistance and support for those inventions which are found in the evaluation process to have commercial promise;

"(21) demonstrate the results of the Institute's activities by exhibits or other methods of technology transfer, including the use of scientific or technical personnel of the Institute for part-time or intermittent teaching and training activities at educational institutions of higher learning as part of and incidental to their official duties; and

"(22) undertake such other activities similar to those specified in this subsection as the Director determines appropriate."

(b) OTHER FUNCTIONS OF SECRETARY.—The Secretary of Commerce is authorized to—

(1) conduct research on all of the telecommunications sciences, including wave propagation and reception, the conditions which affect electromagnetic wave propagation and reception, electromagnetic noise and interference, radio system characteristics, operating techniques affecting the use of the electromagnetic spectrum, and methods for improving the use of the electromagnetic spectrum for telecommunications purposes;

(2) prepare and issue predictions of electromagnetic wave propagation conditions and warnings of disturbances in such conditions;

(3) investigate conditions which affect the transmission of radio waves from their source to a receiver and the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operations;

(4) conduct research and analysis in the general field of telecommunications sciences in support of assigned functions and in support of other Government agencies;

(5) investigate nonionizing electromagnetic radiation and its uses, as well as methods and procedures for measuring and assessing electromagnetic environments, for the purpose of developing and coordinating policies and procedures affecting Federal Government use of the electromagnetic spectrum for telecommunications purposes;

(6) compile, evaluate, publish, and otherwise disseminate general scientific and technical data resulting from the performance of the functions specified in this section or from other sources when such data are important to science, engineering, or industry, or to the general public, and are not available elsewhere; and

(7) undertake such other activities similar to those specified in this subsection as the Secretary of Commerce determines appropriate.

(c) **DIRECTOR OF INSTITUTE.**—(1) Section 5 of the Act of March 3, 1901 (15 U.S.C. 274) is amended to read as follows:

"Sec. 5. The Director shall be appointed by the President, by and with the advice and consent of the Senate. The Director shall have the general supervision of the Institute, its equipment, and the exercise of its functions. The Director shall make an annual report to the Secretary of Commerce. The Director may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the exercise of the functions of the Institute. The Director shall be compensated at the rate in effect for level IV of the Executive Schedule under section 5315 of title 5, United States Code. Until such time as the Director assumes office under this section, the most recent Director of the National Bureau of Standards shall serve as Director."

Reports.

(2) Section 5315 of title 5, United States Code, is amended by striking "National Bureau of Standards" and inserting in lieu thereof "National Institute of Standards and Technology".

(d) **ORGANIZATION PLAN.**—(1) At least 60 days before its effective date and within 120 days after the date of the enactment of this Act, an initial organization plan for the National Institute of Standards and Technology (hereafter in this part referred to as the "Institute") shall be submitted by the Director of the Institute (hereafter in this part referred to as the "Director") after consultation with the Visiting Committee on Advanced Technology, to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate. Such plan shall—

15 USC 272 note.

(A) establish the major operating units of the Institute;

(B) assign each of the activities listed in section 2(c) of the Act of March 3, 1901, and all other functions and activities of the

Institute, to at least one of the major operating units established under subparagraph (A);

(C) provide details of a 2-year program for the Institute, including the Advanced Technology Program;

(D) provide details regarding how the Institute will expand and fund the Inventions program in accordance with section 27 of the Act of March 3, 1901; and

(E) make no changes in the Center for Building Technology or the Center for Fire Research.

(2) The Director may revise the organization plan. Any revision of the organization plan submitted under paragraph (1) shall be submitted to the appropriate committees of the House of Representatives and the Senate at least 60 days before the effective date of such revision.

(3) Until the effective date of the organization plan, the major operating units of the Institute shall be the major operating units of the National Bureau of Standards that were in existence on the date of the enactment of this Act and the Advanced Technology Program.

SEC. 5113. REPEAL OF PROVISIONS.

The second paragraph of the material relating to the Bureau of Standards in the first section of the Act of July 16, 1914 (15 U.S.C. 280), the last paragraph of the material relating to Contingent and Miscellaneous Expenses in the first section of the Act of March 4, 1913 (15 U.S.C. 281), and the first section of the Act of May 14, 1930 (15 U.S.C. 282) are repealed.

SEC. 5114. REPORTS TO CONGRESS; STUDIES BY THE NATIONAL ACADEMIES OF ENGINEERING AND SCIENCES.

The Act of March 3, 1901 (15 U.S.C. 271 et seq.) is amended—

(1) by redesignating section 23 as section 31; and

(2) by adding after section 22 the following new sections:

"REPORTS TO CONGRESS

"Sec. 23. (a) The Director shall keep the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives fully and currently informed with regard to all of the activities of the Institute.

"(b) The Director shall justify in writing all changes in policies regarding fees for standard reference materials and calibration services occurring after June 30, 1987, including a description of the anticipated impact of any proposed changes on demand for and anticipated revenues from the materials and services. Changes in policy and fees shall not be effective unless and until the Director has submitted the proposed schedule and justification to the Congress and 30 days on which both Houses of Congress are in session have elapsed since such submission, except that the requirement of this sentence shall not apply with respect to adjustments which are based solely on changes in the costs of raw materials or of producing and delivering standard reference materials or calibration services.

"STUDIES BY THE NATIONAL RESEARCH COUNCIL

"Sec. 24. The Director may periodically contract with the National Research Council for advice and studies to assist the Institute

15 USC 271 note.

15 USC 278i.

Contracts.
15 USC 278j.

to serve United States industry and science. The subjects of such advice and studies may include—

"(1) the competitive position of the United States in key areas of manufacturing and emerging technologies and research activities which would enhance that competitiveness;

"(2) potential activities of the Institute, in cooperation with industry and the States, to assist in the transfer and dissemination of new technologies for manufacturing and quality assurance; and

"(3) identification and assessment of likely barriers to widespread use of advanced manufacturing technology by the United States workforce, including training and other initiatives which could lead to a higher percentage of manufacturing jobs of United States companies being located within the borders of our country."

SEC. 5115. TECHNICAL AMENDMENTS.

(a) AMENDMENTS TO ORGANIC ACT.—(1) Except as provided in paragraph (2), the Act of March 3, 1901 (15 U.S.C. 271 et seq.) is amended by striking "National Bureau of Standards", "Bureau" and "bureau" wherever they appear and inserting in lieu thereof "Institute".

(2) Section 31 of such Act, as so redesignated by section 5114(1) of this part, is amended by striking "National Bureau of Standards" and inserting in lieu thereof "National Institute of Standards and Technology".

15 USC 271 note.

(b) AMENDMENTS TO STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT OF 1980.—(1) Section 8(b) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122 of this part, is amended by striking "Director" and inserting in lieu thereof "Assistant Secretary".

15 USC 3706.

(2) Sections 11(e) and 17(d) and (e) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part, are amended—

15 USC 3710, 3711a.

(A) by striking "National Bureau of Standards" wherever it appears and inserting in lieu thereof "National Institute of Standards and Technology"; and

(B) by striking "Bureau" wherever it appears and inserting in lieu thereof "Institute".

15 USC 3710.

(c) AMENDMENTS TO OTHER LAWS.—References in any other Federal law to the National Bureau of Standards shall be deemed to refer to the National Institute of Standards and Technology.

15 USC 271 note.

Subpart B—Technology Extension Activities and Clearinghouse on State and Local Initiatives

SEC. 5121. TECHNOLOGY EXTENSION ACTIVITIES.

(a) TECHNOLOGY CENTERS AND TECHNICAL ASSISTANCE.—The Act of March 3, 1901, as amended by this part, is further amended by adding after section 24 the following new sections:

"REGIONAL CENTERS FOR THE TRANSFER OF MANUFACTURING TECHNOLOGY

"SEC. 25. (a) The Secretary, through the Director and, if appropriate, through other officials, shall provide assistance for the creation and support of Regional Centers for the Transfer of Manu-

15 USC 278k.

facturing Technology (hereafter in this Act referred to as the 'Centers'). Such centers shall be affiliated with any United States-based nonprofit institution or organization, or group thereof, that applies for and is awarded financial assistance under this section in accordance with the description published by the Secretary in the Federal Register under subsection (c)(2). Individual awards shall be decided on the basis of merit review. The objective of the Centers is to enhance productivity and technological performance in United States manufacturing through—

"(1) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

Schools and
colleges.

"(2) the participation of individuals from industry, universities, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

"(3) efforts to make new manufacturing technology and processes usable by United States-based small- and medium-sized companies;

"(4) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small- and medium-sized manufacturing companies; and

"(5) the utilization, when appropriate, of the expertise and capability that exists in Federal laboratories other than the Institute.

"(b) The activities of the Centers shall include—

"(1) the establishment of automated manufacturing systems and other advanced production technologies, based on research by the Institute, for the purpose of demonstrations and technology transfer;

"(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small- and medium-sized manufacturers; and

"(3) loans, on a selective, short-term basis, of items of advanced manufacturing equipment to small manufacturing firms with less than 100 employees.

"(c)(1) The Secretary may provide financial support to any Center created under subsection (a) for a period not to exceed six years. The Secretary may not provide to a Center more than 50 percent of the capital and annual operating and maintenance funds required to create and maintain such Center.

Federal
Register,
publication.

"(2) The Secretary shall publish in the Federal Register, within 90 days after the date of the enactment of this section, a draft description of a program for establishing Centers, including—

"(A) a description of the program;

"(B) procedures to be followed by applicants;

"(C) criteria for determining qualified applicants;

"(D) criteria, including those listed under paragraph (4), for choosing recipients of financial assistance under this section from among the qualified applicants; and

"(E) maximum support levels expected to be available to Centers under the program in the fourth through sixth years of assistance under this section.

The Secretary shall publish a final description under this paragraph after the expiration of a 30-day comment period.

"(3) Any nonprofit institution, or group thereof, or consortia of nonprofit institutions, including entities existing on the date of the enactment of this section, may submit to the Secretary an application for financial support under this subsection, in accordance with the procedures established by the Secretary and published in the Federal Register under paragraph (2). In order to receive assistance under this section, an applicant shall provide adequate assurances that it will contribute 50 percent or more of the proposed Center's capital and annual operating and maintenance costs for the first three years and an increasing share for each of the last three years. Each applicant shall also submit a proposal for the allocation of the legal rights associated with any invention which may result from the proposed Center's activities.

"(4) The Secretary shall subject each such application to merit review. In making a decision whether to approve such application and provide financial support under this subsection, the Secretary shall consider at a minimum (A) the merits of the application, particularly those portions of the application regarding technology transfer, training and education, and adaptation of manufacturing technologies to the needs of particular industrial sectors, (B) the quality of service to be provided, (C) geographical diversity and extent of service area, and (D) the percentage of funding and amount of in-kind commitment from other sources.

"(5) Each Center which receives financial assistance under this section shall be evaluated during its third year of operation by an evaluation panel appointed by the Secretary. Each such evaluation panel shall be composed of private experts, none of whom shall be connected with the involved Center, and Federal officials. An official of the Institute shall chair the panel. Each evaluation panel shall measure the involved Center's performance against the objectives specified in this section. The Secretary shall not provide funding for the fourth through the sixth years of such Center's operation unless the evaluation is positive. If the evaluation is positive, the Secretary may provide continued funding through the sixth year at declining levels, which are designed to ensure that the Center no longer needs financial support from the Institute by the seventh year. In no event shall funding for a Center be provided by the Department of Commerce after the sixth year of the operation of a Center.

"(6) The provisions of chapter 18 of title 35, United States Code, shall (to the extent not inconsistent with this section) apply to the promotion of technology from research by Centers under this section.

"(d) There are authorized to be appropriated for the purposes of carrying out this section, a combined total of not to exceed \$40,000,000 for fiscal years 1989 and 1990. Such sums shall remain available until expended.

Appropriation
authorization.

"ASSISTANCE TO STATE TECHNOLOGY PROGRAMS

"SEC. 26. (a) In addition to the Centers program created under section 25, the Secretary, through the Director and, if appropriate, through other officials, shall provide technical assistance to State technology programs throughout the United States, in order to help those programs help businesses, particularly small- and medium-sized businesses, to enhance their competitiveness through the application of science and technology.

15 USC 2781.

"(b) Such assistance from the Institute to State technology programs shall include, but not be limited to—

"(1) technical information and advice from Institute personnel;

"(2) workshops and seminars for State officials interested in transferring Federal technology to businesses; and

"(3) entering into cooperative agreements when authorized to do so under this or any other Act."

Contracts.

15 USC 2781
note.

(b) **TECHNOLOGY EXTENSION SERVICES.**—(1) The Secretary shall conduct a nationwide study of current State technology extension services. The study shall include—

(A) a thorough description of each State program, including its duration, its annual budget, and the number and types of businesses it has aided;

(B) a description of any anticipated expansion of each State program and its associated costs;

(C) an evaluation of the success of the services in transferring technology, modernizing manufacturing processes, and improving the productivity and profitability of businesses;

(D) an assessment of the degree to which State services make use of Federal programs, including the Small Business Innovative Research program and the programs of the Federal Laboratory Consortium, the National Technical Information Service, the National Science Foundation, the Office of Productivity, Technology, and Innovation, and the Small Business Administration;

(E) a survey of what additional Federal information and technical assistance the services could utilize; and

(F) an assessment of how the services could be more effective agents for the transfer of Federal scientific and technical information, including the results and application of Federal and federally funded research.

The Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate, at the time of submission of the organization plan for the Institute under section 5112(d)(1), the results of the study and an initial implementation plan for the programs under section 26 of the Act of March 3, 1901, and under this section. The implementation plan shall include methods of providing technical assistance to States and criteria for awarding financial assistance under this section. The Secretary may make use of contractors and experts for any or all of the studies and findings called for in this section.

Contracts.

(2)(A) The Institute shall enter into cooperative agreements with State technology extension services to—

(i) demonstrate methods by which the States can, in cooperation with Federal agencies, increase the use of Federal technology by businesses within their States to improve industrial competitiveness; or

(ii) help businesses in their States take advantage of the services and information offered by the Regional Centers for the Transfer of Manufacturing Technology created under section 25 of the Act of March 3, 1901.

(B) Any State, for itself or for a consortium of States, may submit to the Secretary an application for a cooperative agreement under this subsection, in accordance with procedures established by the Secretary. To qualify for a cooperative agreement under this subsec-

tion, a State shall provide adequate assurances that it will increase its spending on technology extension services by an amount at least equal to the amount of Federal assistance.

(C) In evaluating each application, the Secretary shall consider—

- (i) the number and types of additional businesses that will be ~~assisted under the cooperative agreement;~~
- (ii) the extent to which the State extension service will demonstrate new methods to increase the use of Federal technology;
- (iii) geographic diversity; and
- (iv) the ability of the State to maintain the extension service after the cooperative agreement has expired.

(D) States which are party to cooperative agreements under this subsection may provide services directly or may arrange for the provision of any or all of such services by institutions of higher education or other non-profit institutions or organizations.

(3) In carrying out section 26 of the Act of March 3, 1901, and this subsection, the Secretary shall coordinate the activities with the Federal Laboratory Consortium; the National Technical Information Service; the National Science Foundation; the Office of Productivity, Technology, and Innovation; the Small Business Administration; and other appropriate Federal agencies.

(4) There are authorized to be appropriated for the purposes of this subsection \$2,000,000 for each of the fiscal years 1989, 1990, and 1991.

(5) Cooperative agreements entered into under paragraph (2) shall terminate no later than September 30, 1991.

(c) **FEDERAL TECHNOLOGY TRANSFER ACT OF 1986.**—Nothing in sections 25 or 26 of the Act of March 3, 1901, or in subsection (b) of this section shall be construed as limiting the authorities contained in the Federal Technology Transfer Act of 1986 (Public Law 99-502).

(d) **NON-ENERGY INVENTIONS PROGRAM.**—The Act of March 3, 1901, as amended by this part, is further amended by adding after section 26 the following new section:

“NON-ENERGY INVENTIONS PROGRAM

“Sec. 27. In conjunction with the initial organization of the Institute, the Director shall establish a program for the evaluation of inventions that are not energy-related to complement but not replace the Energy-Related Inventions Program established under section 14 of the Federal Nonnuclear Energy Research and Development Act of 1974 (Public Law 93-577). The Director shall submit an initial implementation plan for this program to accompany the organization plan for the Institute. The implementation plan shall include specific cost estimates, implementation schedules, and mechanisms to help finance the development of technologies the program has determined to have potential. In the preparation of the plan, the Director shall consult with appropriate Federal agencies, including the Small Business Administration and the Department of Energy, State and local government organizations, university officials, and private sector organizations in order to obtain advice on how those agencies and organizations might cooperate with the expansion of this program of the Institute.”

SEC. 5122. CLEARINGHOUSE ON STATE AND LOCAL INITIATIVES.

(a) **CLEARINGHOUSE.**—The Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3701 et seq.) is amended—

Appropriation
authorization.

Contracts.
Termination date.
15 USC 278f
note.

15 USC 278m.

15 USC
2705-2708,
2710-2714d,
2711, 2711a,
2712-2714,
15 USC 2704a.

(1) by redesignating sections 6 through 19 as sections 7 through 20, respectively; and

(2) by inserting after section 5 the following new section:

"SEC. 4. CLEARINGHOUSE FOR STATE AND LOCAL INITIATIVES ON PRODUCTIVITY, TECHNOLOGY, AND INNOVATION.

"(a) ESTABLISHMENT.—There is established within the Office of Productivity, Technology, and Innovation a Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation. The Clearinghouse shall serve as a central repository of information on initiatives by State and local governments to enhance the competitiveness of American business through the stimulation of productivity, technology, and innovation and Federal efforts to assist State and local governments to enhance competitiveness.

"(b) RESPONSIBILITIES.—The Clearinghouse may—

"(1) establish relationships with State and local governments, and regional and multistate organizations of such governments, which carry out such initiatives;

"(2) collect information on the nature, extent, and effects of such initiatives, particularly information useful to the Congress, Federal agencies, State and local governments, regional and multistate organizations of such governments, businesses, and the public throughout the United States;

"(3) disseminate information collected under paragraph (2) through reports, directories, handbooks, conferences, and seminars;

"(4) provide technical assistance and advice to such governments with respect to such initiatives, including assistance in determining sources of assistance from Federal agencies which may be available to support such initiatives;

"(5) study ways in which Federal agencies, including Federal laboratories, are able to use their existing policies and programs to assist State and local governments, and regional and multistate organizations of such governments, to enhance the competitiveness of American business;

"(6) make periodic recommendations to the Secretary, and to other Federal agencies upon their request, concerning modifications in Federal policies and programs which would improve Federal assistance to State and local technology and business assistance programs;

"(7) develop methodologies to evaluate State and local programs, and, when requested, advise State and local governments, and regional and multistate organizations of such governments, as to which programs are most effective in enhancing the competitiveness of American business through the stimulation of productivity, technology, and innovation; and

"(8) make use of, and disseminate, the nationwide study of State industrial extension programs conducted by the Secretary.

"(c) CONTRACTS.—In carrying out subsection (b), the Secretary may enter into contracts for the purpose of collecting information on the nature, extent, and effects of initiatives.

"(d) TRIENNIAL REPORT.—The Secretary shall prepare and transmit to the Congress once each 3 years a report on initiatives by State and local governments to enhance the competitiveness of American businesses through the stimulation of productivity, technology, and innovation. The report shall include recommendations to the Presi-

dent, the Congress, and to Federal agencies on the appropriate Federal role in stimulating State and local efforts in this area. The first of these reports shall be transmitted to the Congress before January 1, 1989."

(b) DEFINITION.—Section 4 of such Act is amended by adding at the end thereof the following new paragraph: 15 USC 3703.

"(13) 'Clearinghouse' means the Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation established by section 6."

(c) CONFORMING AMENDMENT.—Section 10(d) of such Act, as so redesignated by section 5122(a)(1) of this part, is amended by striking "6, 8, 10, 14, 16, or 17" and inserting in lieu thereof "7, 9, 11, 15, 17, or 18". 15 USC 3708.

Subpart C—Advanced Technology Program

SEC. 5131. ADVANCED TECHNOLOGY.

(a) ADVANCED TECHNOLOGY PROGRAM.—The Act of March 3, 1901, as amended by this part, is further amended by adding after section 27 the following new section:

"ADVANCED TECHNOLOGY PROGRAM

"SEC. 28. (a) There is established in the Institute an Advanced Technology Program (hereafter in this Act referred to as the 'Program') for the purpose of assisting United States businesses in creating and applying the generic technology and research results necessary to— 15 USC 278n.

"(1) commercialize significant new scientific discoveries and technologies rapidly; and

"(2) refine manufacturing technologies.

The Secretary, acting through the Director, shall assure that the Program focuses on improving the competitive position of the United States and its businesses, gives preference to discoveries and to technologies that have great economic potential, and avoids providing undue advantage to specific companies.

"(b) Under the Program established in subsection (a), and consistent with the mission and policies of the Institute, the Secretary, acting through the Director, and subject to subsections (c) and (d), may—

"(1) aid United States joint research and development ventures (hereafter in this section referred to as 'joint ventures') (which may also include universities and independent research organizations), including those involving collaborative technology demonstration projects which develop and test prototype equipment and processes, through—

"(A) provision of organizational and technical advice; and

"(B) participation in such joint ventures, if the Secretary, acting through the Director, determines participation to be appropriate, which may include (i) partial start-up funding, (ii) provision of a minority share of the cost of such joint ventures for up to 5 years, and (iii) making available equipment, facilities, and personnel,

provided that emphasis is placed on areas where the Institute has scientific or technological expertise, on solving generic problems of specific industries, and on making those industries more competitive in world markets;

Contracts.

"(2) enter into contracts and cooperative agreements with United States businesses, especially small businesses, and with independent research organizations, provided that emphasis is placed on applying the Institute's research, research techniques, and expertise to those organizations' research programs;

"(3) involve the Federal laboratories in the Program, where appropriate, using among other authorities the cooperative research and development agreements provided for under section 12 of the Stevenson-Wydler Technology Innovation Act of 1980; and

"(4) carry out, in a manner consistent with the provisions of this section, such other cooperative research activities with joint ventures as may be authorized by law or assigned to the Program by the Secretary.

"(c) The Secretary, acting through the Director, is authorized to take all actions necessary and appropriate to establish and operate the Program, including—

Federal Register, publication.

"(1) publishing in the Federal Register draft criteria and, no later than six months after the date of the enactment of this section, following a public comment period, final criteria, for the selection of recipients of assistance under subsection (b) (1) and (2);

Reports.

"(2) monitoring how technologies developed in its research program are used, and reporting annually to the Congress on the extent of any overseas transfer of these technologies;

Contracts.

"(3) establishing procedures regarding financial reporting and auditing to ensure that contracts and awards are used for the purposes specified in this section, are in accordance with sound accounting practices, and are not funding existing or planned research programs that would be conducted in the same time period in the absence of financial assistance under the Program;

"(4) assuring that the advice of the Committee established under section 10 is considered routinely in carrying out the responsibilities of the Institute; and

"(5) providing for appropriate dissemination of Program research results.

Contracts.

"(d) When entering into contracts or making awards under subsection (b), the following shall apply:

"(1) No contract or award may be made until the research project in question has been subject to a merit review, and has, in the opinion of the reviewers appointed by the Director and the Secretary, acting through the Director, been shown to have scientific and technical merit.

"(2) In the case of joint ventures, the Program shall not make an award unless, in the judgment of the Secretary, acting through the Director, Federal aid is needed if the industry in question is to form a joint venture quickly.

"(3) No Federal contract or cooperative agreement under subsection (b)(2) shall exceed \$2,000,000 over 3 years, or be for more than 3 years unless a full and complete explanation of such proposed award, including reasons for exceeding these limits, is submitted in writing by the Secretary to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives. The proposed contract or cooperative agreement may be executed only after 30 calendar days on which both Houses of Congress are in session have elapsed since such submission. Federal funds made available under subsec-

tion (b)(2) shall be used only for direct costs and not for indirect costs, profits, or management fees of the contractor.

"(4) In determining whether to make an award to a particular joint venture, the Program shall consider whether the members of the joint venture have made provisions for the appropriate participation of small United States businesses in such joint venture.

"(5) Section 552 of title 5, United States Code, shall not apply to the following information obtained by the Federal Government on a confidential basis in connection with the activities of any business or any joint venture receiving funding under the Program—

Classified
information.

"(A) information on the business operation of any member of the business or joint venture; and

"(B) trade secrets possessed by any business or any member of the joint venture.

"(6) Intellectual property owned and developed by any business or joint venture receiving funding or by any member of such a joint venture may not be disclosed by any officer or employee of the Federal Government except in accordance with a written agreement between the owner or developer and the Program.

Intellectual
property.
Classified
information.

"(7) The Federal Government shall be entitled to a share of the licensing fees and royalty payments made to and retained by any business or joint venture to which it contributes under this section in an amount proportional to the Federal share of the costs incurred by the business or joint venture as determined by independent audit.

"(8) If a business or joint venture fails before the completion of the period for which a contract or award has been made, after all allowable costs have been paid and appropriate audits conducted, the unspent balance of the Federal funds shall be returned by the recipient to the Program.

"(9) Upon dissolution of any joint venture or at the time otherwise agreed upon, the Federal Government shall be entitled to a share of the residual assets of the joint venture proportional to the Federal share of the costs of the joint venture as determined by independent audit.

"(e) As used in this section, the term 'joint research and development venture' has the meaning given to such term in section 2(a)(6) of the National Cooperative Research Act of 1984 (15 U.S.C. 4301(a)(6))."

(b) VISITING COMMITTEE ON ADVANCED TECHNOLOGY.—Section 10 of the Act of March 3, 1901, is amended to read as follows:

"VISITING COMMITTEE ON ADVANCED TECHNOLOGY

"SEC. 10. (a) There is established within the Institute a Visiting Committee on Advanced Technology (hereafter in this Act referred to as the 'Committee'). The Committee shall consist of nine members appointed by the Director, at least five of whom shall be from United States industry. The Director shall appoint as original members of the Committee any final members of the National Bureau of Standards Visiting Committee who wish to serve in such capacity. In addition to any powers and functions otherwise granted to it by this Act, the Committee shall review and make recommendations regarding general policy for the Institute, its organization, its

Establishment.
15 USC 278.

budget, and its programs within the framework of applicable national policies as set forth by the President and the Congress.

"(b) The persons appointed as members of the Committee—

"(1) shall be eminent in fields such as business, research, new product development, engineering, labor, education, management consulting, environment, and international relations;

"(2) shall be selected solely on the basis of established records of distinguished service;

"(3) shall not be employees of the Federal Government; and

"(4) shall be so selected as to provide representation of a cross-section of the traditional and emerging United States industries.

The Director is requested, in making appointments of persons as members of the Committee, to give due consideration to any recommendations which may be submitted to the Director by the National Academies, professional societies, business associations, labor associations, and other appropriate organizations.

"(c)(1) The term of office of each member of the Committee, other than the original members, shall be 3 years; except that any member appointed to fill a vacancy occurring prior to the expiration of the term for which his predecessor was appointed shall be appointed for the remainder of such term. Any person who has completed two consecutive full terms of service on the Committee shall thereafter be ineligible for appointment during the one-year period following the expiration of the second such term.

"(2) The original members of the Committee shall be elected to three classes of three members each; one class shall have a term of one year, one a term of two years, and the other a term of three years.

"(d) The Committee shall meet at least quarterly at the call of the Chairman or whenever one-third of the members so request in writing. A majority of the members of the Committee not having a conflict of interest in the matter being considered by the Committee shall constitute a quorum. Each member shall be given appropriate notice, whenever possible, not less than 15 days prior to any meeting, of the call of such meeting.

"(e) The Committee shall have an executive committee, and may delegate to it or to the Secretary such of the powers and functions granted to the Committee by this Act as it deems appropriate. The Committee is authorized to appoint from among its members such other committees as it deems necessary, and to assign to committees so appointed such survey and advisory functions as the Committee deems appropriate to assist it in exercising its powers and functions under this Act.

"(f) The election of the Chairman and Vice Chairman of the Committee shall take place at each annual meeting occurring in an even-numbered year. The Vice Chairman shall perform the duties of the Chairman in his absence. In case a vacancy occurs in the chairmanship or vice chairmanship, the Committee shall elect a member to fill such vacancy.

"(g) The Committee may, with the concurrence of a majority of its members, permit the appointment of a staff consisting of not more than four professional staff members and such clerical staff members as may be necessary. Such staff shall be appointed by the Director, after consultation with the Chairman of the Committee, and assigned at the direction of the Committee. The professional members of such staff may be appointed without regard to the

provisions of title 5, United States Code, governing appointments in the competitive service and the provisions of chapter 51 of title 5 of such Code relating to classification, and compensated at a rate not exceeding the appropriate rate provided for individuals in grade GS-18 of the General Schedule under section 5332 of title 5 of such Code, as may be necessary to provide for the performance of such duties as may be prescribed by the Committee in connection with the exercise of its powers and functions under this Act.

"(h)(1) The Committee shall render an annual report to the Secretary for submission to the Congress on or before January 31 in each year. Such report shall deal essentially, though not necessarily exclusively, with policy issues or matters which affect the Institute, including the Program established under section 28, or with which the Committee in its official role as the private sector policy advisor of the Institute is concerned. Each such report shall identify areas of research and research techniques of the Institute of potential importance to the long-term competitiveness of United States industry, in which the Institute possesses special competence, which could be used to assist United States enterprises and United States industrial joint research and development ventures.

Reports.

"(2) The Committee shall render to the Secretary and the Congress such additional reports on specific policy matters as it deems appropriate."

Reports.

(c) NATIONAL ACADEMIES OF SCIENCES AND ENGINEERING STUDY OF GOVERNMENT-INDUSTRY COOPERATION IN CIVILIAN TECHNOLOGY.—(1) Within 90 days after the date of enactment of this Act, the Secretary of Commerce shall enter into contracts with the National Academies of Sciences and Engineering for a thorough review of the various types of arrangements under which the private sector in the United States and the Federal Government cooperate in civilian research and technology transfer, including activities to create or apply generic, nonproprietary technologies. The purpose of the review is to provide the Secretary and Congress with objective information regarding the uses, strengths, and limitations of the various types of cooperative technology arrangements that have been used in the United States. The review is to provide both an analysis of the ways in which these arrangements can help improve the technological performance and international competitiveness of United States industry, and also to provide the Academies' recommendations regarding ways to improve the effectiveness and efficiency of these types of cooperative arrangements. A special emphasis shall be placed on discussions of these subjects among industry leaders, labor leaders, and officials of the executive branch and Congress. The Secretary is authorized to seek and accept funding for this study from both Federal agencies and private industry.

Contracts.
15 USC 278n
note.

(2) The members of the review panel shall be drawn from among industry and labor leaders, entrepreneurs, former government officials with great experience in civilian research and technology, and scientific and technical experts, including experts with experience with Federal laboratories.

(3) The review shall analyze the strengths and weaknesses of different types of Federal-industry cooperative arrangements in civilian technology, including but not limited to—

(A) Federal programs which provide technical services and information to United States companies;

(B) cooperation between Federal laboratories and United States companies, including activities under the Technology Share Program created by Executive Order 12591;

(C) Federal research and technology transfer arrangements with selected business sectors;

(D) Federal encouragement of, and assistance to, private joint research and development ventures; and

(E) such other mechanisms of Federal-industry cooperation as may be identified by the Secretary.

Reports.

(4) A report based on the findings and recommendations of the review panel shall be submitted to the Secretary, the President, and Congress within 18 months after the Secretary signs the contracts with the National Academies of Sciences and Engineering.

Subpart D—Technology Reviews

SEC. 5141. REPORT OF PRESIDENT.

The President shall, at the time of submission of the budget request for fiscal year 1990 to Congress, also submit to the Congress a report on—

(1) the President's policies and budget proposals regarding Federal research in semiconductors and semiconductor manufacturing technology, including a discussion of the respective roles of the various Federal departments and agencies in such research;

(2) the President's policies and budget proposals regarding Federal research and acquisition policies for fiber optics and optical-electronic technologies generally;

(3) the President's policies and budget proposals, identified by agency, regarding superconducting materials, including descriptions of research priorities, the scientific and technical barriers to commercialization which such research is designed to overcome, steps taken to ensure coordination among Federal agencies conducting research on superconducting materials, and steps taken to consult with private United States industry and to ensure that no unnecessary duplication of research exists and that all important scientific and technical barriers to the commercialization of superconducting materials will be addressed; and

(4) the President's policies and budget proposals, identified by agency, regarding Federal research to assist United States industry to develop and apply advanced manufacturing technologies for the production of durable and nondurable goods.

SEC. 5142. SEMICONDUCTOR RESEARCH AND DEVELOPMENT.

(a) **SHORT TITLE.**—This section may be cited as the "National Advisory Committee on Semiconductor Research and Development Act of 1988".

(b) **FINDINGS AND PURPOSES.**—(1) The Congress finds and declares that—

(A) semiconductor technology is playing an ever-increasing role in United States industrial and commercial products and processes, making secure domestic sources of state-of-the-art semiconductors highly desirable;

(B) modern weapons systems are highly dependent on leading edge semiconductor devices, and it is counter to the national

National
Advisory
Committee on
Semiconductor
Research and
Development
Act of 1988.
15 USC 4632.

security interest to be heavily dependent upon foreign sources for this technology;

(C) governmental responsibilities related to the semiconductor industry are divided among many Federal departments and agencies; and

(D) joint industry-government consideration of semiconductor industry problems is needed at this time.

(2) The purposes of this section are—

(A) to establish the National Advisory Committee on Semiconductors; and

(B) to assign to such Committee the responsibility for devising and promulgating a national semiconductor strategy, including research and development, the implementation of which will assure the continued leadership of the United States in semiconductor technology.

(c) **CREATION OF COMMITTEE.**—There is hereby created in the executive branch of the Government an independent advisory body to be known as the National Advisory Committee on Semiconductors (hereafter in this section referred to as the "Committee").

(d) **FUNCTIONS.**—(1) The Committee shall—

(A) collect and analyze information on the needs and capabilities of industry, the Federal Government, and the scientific and research communities related to semiconductor technology;

(B) identify the components of a successful national semiconductor strategy in accordance with subsection (b)(2)(B);

(C) analyze options, establish priorities, and recommend roles for participants in the national strategy;

(D) assess the roles for government and national laboratories and other laboratories supported largely for government purposes in contributing to the semiconductor technology base of the Nation, as well as to assess the effective use of the resources of United States private industry, United States universities, and private-public research and development efforts; and

(E) provide results and recommendations to agencies of the Federal Government involved in legislative, policymaking, administrative, management, planning, and technology activities that affect or are part of a national semiconductor strategy, and to the industry and other nongovernmental groups or organizations affected by or contributing to that strategy.

(2) In fulfilling this responsibility, the Committee shall—

(A) monitor the competitiveness of the United States semiconductor technology base;

(B) determine technical areas where United States semiconductor technology is deficient relative to international competition;

(C) identify new or emerging semiconductor technologies that will impact the national defense or United States competitiveness or both;

(D) develop research and development strategies, tactics, and plans whose execution will assure United States semiconductor competitiveness; and

(E) recommend appropriate actions that support the national semiconductor strategy.

(e) **MEMBERSHIP AND PROCEDURES.**—(1)(A) The Committee shall be composed of 13 members, 7 of whom shall constitute a quorum.

(B) The Secretary of Defense, the Secretary of Commerce, the Secretary of Energy, the Director of the Office of Science and

Technology Policy, and the Director of the National Science Foundation, or their designees, shall serve as members of the Committee.

President of U.S.

(C) The President, acting through the Director of the Office of Science and Technology Policy, shall appoint, as additional members of the Committee, 4 members from outside the Federal Government who are eminent in the semiconductor industry, and 4 members from outside the Federal Government who are eminent in the fields of technology, defense, and economic development.

(D) One of the members appointed under subparagraph (C), as designated by the President at the time of appointment, shall be chairman of the Committee.

(2) Funding and administrative support for the Committee shall be provided to the Office of Science and Technology Policy through an arrangement with an appropriate agency or organization designated by the Committee, in accordance with a memorandum of understanding entered into between them.

(3) Members of the Committee, other than full-time employees of the Federal Government, while attending meetings of the Committee or otherwise performing duties at the request of the Chairman while away from their homes or regular places of business, shall be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5, United States Code.

(4) The Chairman shall call the first meeting of the Committee not later than 90 days after the date of the enactment of this Act.

Reports.

(5) At the close of each fiscal year the Committee shall submit to the President and the Congress a report on its activities conducted during such year and its planned activities for the coming year, including specific findings and recommendations with respect to the national semiconductor strategy devised and promulgated under subsection (b)(2)(B). The first report shall include an analysis of those technical areas, including manufacturing, which are of importance to the United States semiconductor industry, and shall make specific recommendations regarding the appropriate Federal role in correcting any deficiencies identified by the analysis. Each report shall include an estimate of the length of time the Committee must continue before the achievement of its purposes and the issuance of its final report.

(f) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated to carry out the purposes of this section such sums as may be necessary for the fiscal years 1988, 1989, and 1990.

30 USC 1803
note.

SEC. 5143. REVIEW OF RESEARCH AND DEVELOPMENT PRIORITIES IN SUPERCONDUCTORS.

President of U.S.

(a) **NATIONAL COMMISSION ON SUPERCONDUCTIVITY.**—The President shall appoint a National Commission on Superconductivity to review all major policy issues regarding United States applications of recent research advances in superconductors in order to assist the Congress in devising a national strategy, including research and development priorities, the development of which will assure United States leadership in the development and application of superconducting technologies.

(b) **MEMBERSHIP.**—The membership of the National Commission on Superconductivity shall include representatives of—

(1) the National Critical Materials Council, the National Academy of Sciences, the National Academy of Engineering, the National Science Foundation, the National Aeronautics and Space Administration, the Department of Energy, the Depart-

ment of Justice, the Department of Commerce (including the National Institute of Standards and Technology), the Department of Transportation, the Department of the Treasury, and the Department of Defense;

(2) organizations whose membership is comprised of physicists, engineers, chemical scientists, or material scientists; and

(3) industries, universities, and national laboratories engaged in superconductivity research.

(c) **CHAIRMAN.**—A representative of the private sector shall be designated as chairman of the Commission.

(d) **COORDINATION.**—The National Critical Materials Council shall be the coordinating body of the National Commission on Superconductivity and shall provide staff support for the Commission.

(e) **REPORT.**—Within 6 months after the date of the enactment of this Act, the National Commission on Superconductivity shall submit a report to the President and the Congress with recommendations regarding methods of enhancing the research, development, and implementation of improved superconductor technologies in all major applications.

(f) **SCOPE OF REVIEW.**—In preparing the report required by subsection (e), the Commission shall consider addressing, but need not limit, its review to—

(1) the state of United States competitiveness in the development of improved superconductors;

(2) methods to improve and coordinate the collection and dissemination of research data relating to superconductivity;

(3) methods to improve and coordinate funding of research and development of improved superconductors;

(4) methods to improve and coordinate the development of viable commercial and military applications of improved superconductors;

(5) foreign government activities designed to promote research, development, and commercial application of improved superconductors;

(6) the need to provide increased Federal funding of research and development of improved superconductors;

(7) the impact on the United States national security if the United States must rely on foreign producers of superconductors;

(8) the benefit, if any, of granting private companies partial exemptions from United States antitrust laws to allow them to coordinate research, development, and products containing improved superconductors;

(9) options for providing income tax incentives for encouraging research, development, and production in the United States of products containing improved superconductors; and

(10) methods to strengthen domestic patent and trademark laws to ensure that qualified superconductivity discoveries receive the fullest protection from infringement.

(g) **SUNSET.**—The Commission shall disband within a year of its establishment. Thereafter the National Critical Materials Council may review and update the report required by subsection (e) and make further recommendations as it deems appropriate.

Termination
date.

Subpart E—Authorization of Appropriations**SEC. 5151. AUTHORIZATION OF APPROPRIATIONS FOR TECHNOLOGY ACTIVITIES.**

(a) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated for fiscal year 1988 to the Secretary of Commerce to carry out activities performed by the Institute the sums set forth in the following line items:

(1) Measurement Research and Technology: \$41,939,000.

(2) Engineering Measurements and Manufacturing: \$40,287,000.

(3) Materials Science and Engineering: \$23,521,000.

(4) Computer Science and Technology: \$7,941,000.

(5) Research Support Activities: \$19,595,000.

(6) Cold Neutron Source Facility: \$6,500,000 (for a total authorization of \$13,000,000).

(7) Programs established under sections 25, 26, and 27 of the Act of March 3, 1901 and section 5121 of this part: \$5,000,000.

(b) **LIMITATIONS.**—Notwithstanding any other provision of this or any other Act—

(1) of the total of the amounts authorized under subsection (a), \$2,000,000 is authorized only for steel technology;

(2) of the amount authorized under paragraph (1) of subsection (a) of this section, \$3,550,000 is authorized only for the purpose of research in process and quality control;

(3) of the amount authorized under paragraph (2) of subsection (a) of this section, \$3,710,000 is authorized only for the Center for Building Technology, \$5,662,000 is authorized only for the Center for Fire Research, and the two Centers shall not be merged;

(4) of the amount authorized under paragraph (3) of subsection (a) of this section, \$1,500,000 is authorized only for the purpose of research to improve high-performance composites; and

(5) of the amount authorized under paragraph (5) of subsection (a) of this section, \$7,371,000 is authorized only for technical competence fund projects in new areas of high technical importance, and \$1,091,000 is authorized only for the Postdoctoral Research Associates Program and related new personnel.

(c) **TRANSFER.**—(1) Funds may be transferred among the line items listed in subsection (a) of this section so long as the net funds transferred to or from any line item do not exceed 10 percent of the amount authorized for that line item in such subsection and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives are notified in advance of any such transfer.

(2) In addition, the Secretary of Commerce may propose transfers to or from any line item exceeding 10 percent of the amount authorized for the line item in subsection (a) of this section, but a full and complete explanation of any such proposed transfer and the reason for such transfer must be transmitted in writing to the President of the Senate, the Speaker of the House of Representatives, and the appropriate authorizing committees of the Senate and House of Representatives. The proposed transfer may be made only when 30 calendar days have passed after the transmission of such written explanation.

(d) **COLD NEUTRON SOURCE FACILITY.**—In addition to any sums otherwise authorized by this part, there are authorized to be appropriated to the Secretary of Commerce for fiscal years 1988, 1989, and 1990 such sums as were authorized but not appropriated for the Cold Neutron Source Facility for fiscal year 1987. Furthermore, the Secretary may accept contributions for funds, to remain available until expended, for the design, construction, and equipment of the Cold Neutron Source Facility, notwithstanding the limitations of section 14 of the Act of March 3, 1901 (15 U.S.C. 278d).

Gifts and
property.

(e) **EMPLOYEE BENEFIT ADJUSTMENTS.**—In addition to any sums otherwise authorized by this part, there are authorized to be appropriated to the Secretary of Commerce for fiscal year 1988 such additional sums as may be necessary to make any adjustments in salary, pay, retirement, and other employee benefits which may be provided for by law.

(f) **AVAILABILITY.**—Appropriations made under the authority provided in this section shall remain available for obligation, for expenditure, or for obligations and expenditure for periods specified in the Acts making such appropriations.

SEC. 5152. STEVENSON-WYDLER ACT AUTHORIZATIONS.

15 USC 3713.

Section 19 (a) and (b) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part, is amended to read as follows:

"(a)(1) There is authorized to be appropriated to the Secretary for the purposes of carrying out sections 5, 11(g), and 16 of this Act not to exceed \$3,400,000 for the fiscal year ending September 30, 1988.

"(2) Of the amount authorized under paragraph (1) of this subsection, \$2,400,000 is authorized only for the Office of Productivity, Technology, and Innovation; \$500,000 is authorized only for the purpose of carrying out the requirements of the Japanese technical literature program established under section 5(d) of this Act; and \$500,000 is authorized only for the patent licensing activities of the National Technical Information Service.

"(b) In addition to the authorization of appropriations provided under subsection (a) of this section, there is authorized to be appropriated to the Secretary for the purposes of carrying out section 6 of this Act not to exceed \$500,000 for the fiscal year ending September 30, 1988, \$1,000,000 for the fiscal year ending September 30, 1989, and \$1,500,000 for the fiscal year ending September 30, 1990."

Subpart F—Miscellaneous Technology and Commerce Provisions

SEC. 5161. SAVINGS PROVISION AND USER FEES.

The Act of March 3, 1901 (15 U.S.C. 271 et seq.), as amended by this part, is further amended by adding after section 28 the following new sections:

"SAVINGS PROVISION

"Sec. 29. All rules and regulations, determinations, standards, contracts, certifications, authorizations, delegations, results and findings of investigations, or other actions duly issued, made, or taken by or pursuant to this Act, or under the authority of any other statutes which resulted in the assignment of functions or activities to the Secretary, the Department, the Director, or the Institute, as

Contracts.
15 USC 271 note.

are in effect immediately before the date of enactment of this section, and not suspended by the Secretary, the Director, the Institute or the courts, shall continue in full force and effect after the date of enactment of this section until modified or rescinded.

"USER FEES"

15 USC 278o.

"SEC. 30. The Institute shall not implement a policy of charging fees with respect to the use of Institute research facilities by research associates in the absence of express statutory authority to charge such fees."

SEC. 5162. MISCELLANEOUS AMENDMENTS TO THE STEVENSON-WYDLER ACT.

(a) **INVENTION MANAGEMENT SERVICES.**—The first sentence of section 14(a)(4) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part (15 U.S.C. 3710c) is amended by striking out "shall" and inserting in lieu thereof "may", and by striking out "such invention performed at the request of the other agency or laboratory" and inserting in lieu thereof "any invention of the other agency".

(b) **FEDERAL LABORATORY CONSORTIUM.**—Section 11(e)(7)(A) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part (15 U.S.C. 3710) is amended by striking out "0.005 percent of that portion of the research and development budget of each Federal agency that is to be utilized by" and inserting in lieu thereof "0.008 percent of the budget of each Federal agency from any Federal source, including related overhead, that is to be utilized by or on behalf of".

SEC. 5163. MISCELLANEOUS TECHNOLOGY AND COMMERCE PROVISIONS.

15 USC 282a.

(a) **ASSESSMENT OF EMERGING TECHNOLOGIES.**—The Board of Assessment of the National Institute of Standards and Technology shall include, as part of its annual review, an assessment of emerging technologies which are expected to require research in metrology to keep the Institute abreast of its mission, including process and quality control, engineering databases, advanced materials, electronics and fiber optics, bioprocess engineering, and advanced computing concepts. Such review shall include estimates of the cost of the required effort, required staffing levels, appropriate interaction with industry, including technology transfer, and the period over which the research will be required.

15 USC 272 note.

(b) **SMALL BUSINESS PLAN.**—The Director of the National Institute of Standards and Technology shall prepare a plan detailing the manner in which the Institute will make small businesses more aware of the Institute's activities and research, and the manner in which the Institute will seek to increase the application by small businesses of the Institute's research, particularly in manufacturing. The plan shall be submitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives not later than 120 days after the date of the enactment of this Act.

15 USC 3710.

(c) **NATIONAL TECHNICAL INFORMATION SERVICE.**—(1) Section 11 of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part, is amended by inserting at the end the following new subsection:

"(h) None of the activities or functions of the National Technical Information Service which are not performed by contractors as of September 30, 1987, shall be contracted out or otherwise transferred from the Federal Government unless such transfer is expressly authorized by statute, or unless the value of all work performed under the contract and related contracts in each fiscal year does not exceed \$250,000."

Contracts.

(2) The Secretary of Commerce shall report the Secretary's recommendations for improvements in the National Technical Information Service (including methods for automating document distribution and inventory control), and any statutory changes required to make such improvements, to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives by January 31, 1989.

Reports.

(3) Section 11(d) of the Stevenson-Wydler Technology Innovation Act of 1980, as so redesignated by section 5122(a)(1) of this part, is amended—

15 USC 3710.

(A) by striking "and" at the end of paragraph (4);

(B) by striking the period at the end of paragraph (5) and inserting in lieu thereof "; and"; and

(C) by adding at the end thereof the following new paragraph:

"(6) maintain a permanent archival repository and clearinghouse for the collection and dissemination of nonclassified scientific, technical, and engineering information."

15 USC 1533.

(d) **FELLOWSHIP PROGRAM.**—There is established within the Department of Commerce a Commerce, Science, and Technology Fellowship Program with the stated purpose of providing a select group of employees of the executive branch of the Government with the opportunity of learning how the legislative branch and other parts of the executive branch function through work experiences of up to one year. The Secretary of Commerce shall report to the Congress within six months after the date of enactment of this Act on the Department of Commerce's plans for implementing such Program by March 31, 1989.

Reports.

SEC. 5164. METRIC USAGE.

(a) **FINDINGS.**—Section 2 of the Metric Conversion Act of 1975 is amended by adding at the end thereof the following new paragraphs:

15 USC 205a.

"(3) World trade is increasingly geared towards the metric system of measurement.

"(4) Industry in the United States is often at a competitive disadvantage when dealing in international markets because of its nonstandard measurement system, and is sometimes excluded when it is unable to deliver goods which are measured in metric terms.

"(5) The inherent simplicity of the metric system of measurement and standardization of weights and measures has led to major cost savings in certain industries which have converted to that system.

"(6) The Federal Government has a responsibility to develop procedures and techniques to assist industry, especially small business, as it voluntarily converts to the metric system of measurement.

"(7) The metric system of measurement can provide substantial advantages to the Federal Government in its own operations."

15 USC 205b.

(b) **POLICY.**—Section 3 of the Metric Conversion Act of 1975 is amended to read as follows:

"Sec. 3. It is therefore the declared policy of the United States—

"(1) to designate the metric system of measurement as the preferred system of weights and measures for United States trade and commerce;

"(2) to require that each Federal agency, by a date certain and to the extent economically feasible by the end of the fiscal year 1992, use the metric system of measurement in its procurements, grants, and other business-related activities, except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to United States firms, such as when foreign competitors are producing competing products in non-metric units;

"(3) to seek out ways to increase understanding of the metric system of measurement through educational information and guidance and in Government publications; and

"(4) to permit the continued use of traditional systems of weights and measures in nonbusiness activities."

15 USC 205c.

(c) **IMPLEMENTATION.**—The Metric Conversion Act of 1975 is further amended by redesignating section 12 as section 13, and by inserting after section 11 the following new section:

Reports.
15 USC 205j-1.

"Sec. 12. (a) As soon as possible after the date of the enactment of this section, each agency of the Federal Government shall establish guidelines to carry out the policy set forth in section 3 (with particular emphasis upon the policy set forth in paragraph (2) of that section), and as part of its annual budget submission for each fiscal year beginning after such date shall report to the Congress on the actions which it has taken during the previous fiscal year, as well as the actions which it plans for the fiscal year involved, to implement fully the metric system of measurement in accordance with that policy. Such reporting shall cease for an agency in the fiscal year after it has fully implemented its efforts under section 3(2). As used in this section, the term 'agency of the Federal Government' means an Executive agency or military department as those terms as defined in chapter 1 of title 5, United States Code.

"(b) At the end of the fiscal year 1992, the Comptroller General shall review the implementation of this Act, and upon completion of such review shall report his findings to the Congress along with any legislative recommendations he may have."

PART II—SYMMETRICAL ACCESS TO TECHNOLOGICAL RESEARCH

SEC. 502. SYMMETRICAL ACCESS TO TECHNOLOGICAL RESEARCH.

(a) Section 502 of the Foreign Relations Authorization Act, Fiscal Year 1979 (22 U.S.C. 2656b) is amended by adding at the end the following new paragraph:

"(b) Federally supported international science and technology agreements should be negotiated to ensure that—

"(A) intellectual property rights are properly protected;

and

Intellectual
property

"(B) access to research and development opportunities and facilities, and the flow of scientific and technological information, are, to the maximum extent practicable, equitable and reciprocal."

(b) Section 503(b) of the Foreign Relations Authorization Act, Fiscal Year 1979 (22 U.S.C. 2656c(b)) is amended—

(1) by striking "Congress" and inserting in lieu thereof "the Speaker of the House of Representatives and the Committees on Foreign Relations and Governmental Affairs of the Senate";

(2) by inserting "information and" before "recommendations";

(3) by striking "and" at the end of paragraph (1);

(4) by striking the period at the end of paragraph (2) and inserting in lieu thereof "; and"; and

(5) by adding at the end the following new paragraph:

"(3) equity of access by United States public and private entities to public (and publicly supported private) research and development opportunities and facilities in each country which is a major trading partner of the United States."

(c) Section 503 of the Foreign Relations Authorization Act, Fiscal Year 1979 (22 U.S.C. 2656c) is amended by adding at the end the following new subsection:

"(d)(1) The information and recommendations developed under subsection (b)(3) shall be made available to the United States Trade Representative for use in his consultations with Federal agencies pursuant to Executive orders pertaining to the transfer of science and technology.

"(2) In providing such information and recommendations, the President shall utilize information developed by any Federal departments, agencies, or interagency committees as he may consider necessary."

President of U.S.

(d) Section 504(a) of the Foreign Relations Authorization Act, Fiscal Year 1979 (22 U.S.C. 2656d(a)) is amended to read as follows:

"(a)(1) In order to implement the policies set forth in section 502 of this title, the Secretary of State (hereafter in this section referred to as the "Secretary") shall have primary responsibility for coordination and oversight with respect to all major science or science and technology agreements and activities between the United States and foreign countries, international organizations, or commissions of which the United States and one or more foreign countries are members.

"(2) In coordinating and overseeing such agreements and activities, the Secretary shall consider (A) scientific merit; (B) equity of access as described in section 503(b); (C) possible commercial or trade linkages with the United States which may flow from the agreement or activity; (D) national security concerns; and (E) any other factors deemed appropriate.

"(3) Prior to entering into negotiations on such an agreement or activity, the Secretary shall provide Federal agencies which have primary responsibility for, or substantial interest in, the subject matter of the agreement or activity, including those agencies responsible for—

"(A) Federal technology management policies set forth by Public Law 96-517 and the Stevenson-Wydler Technology Innovation Act of 1980;

"(B) national security policies;

"(C) United States trade policies; and

Defense and
national
security.

102 STAT. 1454

PUBLIC LAW 100-418—AUG. 23, 1988

“(D) relevant Executive orders, with an opportunity to review the proposed agreement or activity to ensure its consistency with such policies and Executive orders, and to ensure effective interagency coordination.”.

PART III—NATIONAL CRITICAL MATERIALS COUNCIL

30 USC 1804
note.

SEC. 5181. THE NATIONAL FEDERAL PROGRAM PLAN FOR ADVANCED MATERIALS RESEARCH AND DEVELOPMENT.

The National Critical Materials Council shall prepare the national Federal program plan for advanced materials research and development under section 205(a)(1)(A) of the National Critical Materials Act of 1984 (Public Law 98-373; 98 Stat. 1251) and shall submit such plan to Congress not later than 180 days after the date of the enactment of this Act. The plan shall be submitted to the Committee on Science, Space, and Technology, as well as other appropriate committees, of the House of Representatives, and to the Committee on Governmental Affairs, as well as other appropriate committees, of the Senate.

30 USC 1807
note.

SEC. 5182. PERSONNEL MATTERS.

(a) **REQUIREMENT TO INCREASE STAFF.**—Not later than 30 days after the date of the enactment of this Act, the Executive Director of the National Critical Materials Council shall increase the number of employees of the Council by the equivalent of 5 full-time employees over the number of employees of the Council on the date of the enactment of this Act.

(b) **QUALIFICATIONS OF STAFF.**—Not less than the equivalent of 4 full-time employees appointed pursuant to subsection (a) shall be permanent professional employees who have expertise in technical fields that are relevant to the responsibilities of the National Critical Materials Council, such as materials science and engineering, environmental matters, minerals and natural resources, ceramic or composite engineering, metallurgy, and geology.

SEC. 5183. AUTHORITY TO ACCEPT SERVICES AND PERSONNEL FROM OTHER FEDERAL AGENCIES.

30 USC 1809.

Section 210(4) of the National Critical Materials Act of 1984 (Public Law 98-373; 98 Stat. 1254) is amended by striking out “reimbursable” and inserting in lieu thereof “nonreimbursable”.

SEC. 5184. AUTHORIZATION OF APPROPRIATIONS.

30 USC 1810.

Section 211 of the National Critical Materials Act of 1984 (Public Law 98-373; 98 Stat. 1254) is amended by striking out “1990” and inserting in lieu thereof “1992”.

Competitiveness
Policy Council
Act.

Subtitle C—Competitiveness Policy Council Act

15 USC 4801
note.

SEC. 4301. SHORT TITLE.

This subtitle may be cited as the “Competitiveness Policy Council Act”.

SEC. 5202. FINDINGS AND PURPOSES.

15 USC 4801.

(a) FINDINGS.—The Congress finds that—

(1) efforts to reverse the decline of United States industry has been hindered by—

(A) a serious erosion in the institutions and policies which foster United States competitiveness including a lack of high quality domestic and international economic and scientific data needed to—

- (i) reveal sectoral strengths and weaknesses;
- (ii) identify potential new markets and future technological and economic trends; and
- (iii) provide necessary information regarding the competitive strategies of foreign competitors;

(B) the lack of a coherent and consistent government competitiveness policy, including policies with respect to—

- (i) international trade, finance, and investment,
- (ii) research, science, and technology,
- (iii) education, labor retraining, and adjustment,
- (iv) macroeconomic and budgetary issues,
- (v) antitrust and regulation, and
- (vi) government procurement;

(2) the United States economy benefits when business, labor, government, academia, and public interest groups work together cooperatively;

(3) the decline of United States economic competitiveness endangers the ability of the United States to maintain the defense industrial base which is necessary to the national security of the United States;

(4) the world is moving rapidly toward the creation of an integrated and interdependent economy, a world economy in which the policies of one nation have a major impact on other nations;

(5) integrated solutions to such issues as trade and investment research, science, and technology, education, and labor retraining and adjustments help the United States compete more effectively in the world economy; and

(6) government, business, labor, academia, and public interest groups shall cooperate to develop and coordinate long-range strategies to help assure the international competitiveness of the United States economy.

(b) PURPOSE.—It is the purpose of this subtitle—

(1) to develop recommendations for long-range strategies for promoting the international competitiveness of the United States industries; and

(2) to establish the Competitiveness Policy Council which shall—

(A) analyze information regarding the competitiveness of United States industries and business and trade policy;

(B) create an institutional forum where national leaders with experience and background in business, labor, government, academia, and public interest activities shall—

(i) identify economic problems inhibiting the competitiveness of United States agriculture, business, and industry;

(ii) develop long-term strategies to address such problem; and

Agriculture and
agricultural
commodities.

(C) make recommendations on issues crucial to the development of coordinated competitiveness strategies;

(D) publish analysis in the form of periodic reports and recommendations concerning the United States business and trade policy.

15 USC 4802.

SEC. 5203. COUNCIL ESTABLISHED.

There is established the Competitiveness Policy Council (hereafter in this subtitle referred to as the "Council"), an advisory committee under the provisions of the Federal Advisory Committee Act (5 U.S.C. App.).

15 USC 4803.

SEC. 5204. DUTIES OF THE COUNCIL.

The Council shall—

(1) develop recommendations for national strategies and on specific policies intended to enhance the productivity and international competitiveness of United States industries;

(2) provide comments, when appropriate, and through any existing comment procedure, on—

(A) private sector requests for governmental assistance or relief, specifically as to whether the applicant is likely, by receiving the assistance or relief, to become internationally competitive; and

(B) what actions should be taken by the applicant as a condition of such assistance or relief to ensure that the applicant is likely to become internationally competitive;

(3) analyze information concerning current and future United States economic competitiveness useful to decision making in government and industry;

(4) create a forum where national leaders with experience and background in business, labor, academia, public interest activities, and government shall identify and develop recommendations to address problems affecting the economic competitiveness of the United States;

(5) evaluate Federal policies, regulations, and unclassified international agreement on trade, science, and technology to which the United States is a party with respect to the impact on United States competitiveness;

(6) provide policy recommendations to the Congress, the President, and the Federal departments and agencies regarding specific issues concerning competitiveness strategies;

(7) monitor the changing nature of research, science, and technology in the United States and the changing nature of the United States economy and its capacity—

(A) to provide marketable, high quality goods and services in domestic and international markets; and

(B) to respond to international competition;

(8) identify—

(A) Federal and private sector resources devoted to increased competitiveness; and

(B) State and local government programs devised to enhance competitiveness, including joint ventures between universities and corporations;

(9) establish, when appropriate, subcouncils of public and private leaders to develop recommendations on long-term strategies for sectors of the economy and for specific competitiveness issues;

(10) review policy recommendations developed by the subcouncils and transmit such recommendations to the Federal agencies responsible for the implementation of such recommendations;

(11) prepare, publish, and distribute reports containing the recommendations of the Council; and

(12) publish their analysis and recommendations in the form of an annual report to the President and the Congress which also comments on the overall competitiveness of the American economy. Reports.

SEC. 5205. MEMBERSHIP.

15 USC 4804.

(a) COMPOSITION AND REPRESENTATION.—

(1) The Council shall consist of 12 members, of whom—

(A) four members shall be appointed by the President, of whom—

(i) one shall be a national leader with experience and background in business;

(ii) one shall be a national leader with experience and background in the labor community;

(iii) one shall be a national leader who has been active in public interest activities; and

(iv) one shall be a head of a Federal department or agency;

(B) four members shall be appointed by the majority leader and the minority leader of the Senate, acting jointly, of whom—

(i) one shall be a national leader with experience or background in business;

(ii) one shall be a national leader with experience and background in the labor community;

(iii) one shall be a national leader with experience and background in the academic community; and

(iv) one shall be a representative of State or local government; and

(C) four members shall be appointed by the Speaker, the minority leader of the House of Representatives, acting jointly, of whom—

(i) one shall be a national leader with experience and background in business;

(ii) one shall be a national leader with experience and background in the labor community;

(iii) one shall be a national leader with experience and background in the academic community; and

(iv) one shall be a representative of State or local government.

(2) In addition to the head of a Federal department or agency appointed in accordance with subsection (a)(1)(A)(iv), other Federal officials may participate on an ex-officio basis as requested by the Council.

(3) All members of the Council shall be individuals who have a broad understanding of the United States economy and the United States competitive position internationally.

(4) Not more than 6 members of the Council shall be members of the same political party.

(b) INITIAL APPOINTMENTS.—The initial members of the Council shall be appointed within 30 days after January 21, 1989.

(c) **VACANCIES.**—

(1) A vacancy on the Council shall be filled in the same manner in which the original appointment was made.

(2) Any member appointed to fill a vacancy on the Council occurring before the expiration of the term for which the predecessor of such member was appointed shall be appointed only for the remainder of such term.

(3) A member of the Council may serve after the expiration of the term of such member until the successor of such member has taken office.

(d) **REMOVAL.**—Members of the Council may be removed only for malfeasance in office.

(e) **CONFLICT OF INTEREST.**—

(1) A member of the Council may not serve as an agent for a foreign principal.

(2) Members of the Council shall be required to file a financial disclosure report under title II of the Ethics in Government Act of 1978 (Public Law 95-521), except that such reports shall be held confidential and exempt from any law otherwise requiring their public disclosure.

(3) Members of the Council shall be deemed to be special Government employees, as defined in section 202 of title 18, United States Code, for purposes of sections 201, 202, 203, 205, and 208 of such title.

(f) **COMPENSATION.**—

(1) Each member of the Council who is not employed by the Federal Government or any State or local government—

(A) shall be compensated at a rate equal to the daily equivalent of the rate for GS-18 of the General Schedule pursuant to section 5332 of title 5, United States Code, for each day such member is engaged in duties as a member of the Council; and

(B) shall be paid actual travel expenses, and per diem in lieu of subsistence expenses when away from the usual place of residence of such member, in accordance with section 5703 of such title.

(2) Each member of the Council who is employed by the Federal Government or any State or local government shall serve on the Council without additional compensation, but while engaged in duties as a member of the Council shall be paid actual travel expenses, and per diem in lieu of subsistence expenses when away from the usual place of residence of such member, in accordance with subchapter I of chapter 57 of title 5, United States Code.

(g) **QUORUM.**—

(1) **IN GENERAL.**—Seven members of the Council constitute a quorum, except that a lesser number may hold hearings if such action is approved by a two-thirds vote of the entire Council.

(2) **INITIAL ORGANIZATION.**—The Council shall not commence its duties until all the nongovernmental members have been appointed and have qualified.

(h) **CHAIRPERSON.**—The Council shall elect, by a two-thirds vote of the entire Council, a chairperson from among the nongovernmental members.

(i) **MEETINGS.**—The Council shall meet at the call of the chairperson or a majority of the members.

(j) **POLICY ACTIONS.**—Except as provided in subsection (g), no action establishing policy shall be taken by the Council unless approved by two-thirds of the entire membership of the Council.

(k) **ALTERNATE MEMBERS.**—

(1) Each member of the Council shall designate one alternate representative to attend any meeting that such member is unable to attend.

(2) In the course of attending any such meeting, an alternate representative shall be considered a member of the Council for all purposes, except for voting.

(l) **EXPERTS AND CONSULTANTS.**—The Council may procure temporary and intermittent services under section 3109(b) of title 5, United States Code, but at rates for individuals not to exceed the daily equivalent of the maximum annual rate of basic pay for GS-16 of the General Schedule.

(m) **DETAILS.**—Upon request of the Council, the head of any other Federal agency is authorized to detail, on a reimbursable basis, any of the personnel of such agency to the Council to assist the Council in carrying out its duties under this subtitle.

SEC. 5206. EXECUTIVE DIRECTOR AND STAFF.

15 USC 4805.

(a) **EXECUTIVE DIRECTOR.**—

(1) The principal administrative officer of the Council shall be an Executive Director, who shall be appointed by the Council and who shall be paid at a rate not to exceed GS-18 of the General Schedule.

(2) The Executive Director shall serve on a full-time basis.

(b) **STAFF.**—(1) Within the limitations of appropriations to the Council, the Executive Director may appoint a staff for the Council in accordance with the Federal civil service and classification laws.

(2) The staff of the Council shall be deemed to be special government employees as defined in section 202 of title 18, United States Code, for purposes of title II of the Ethics in Government Act of 1978 and sections 201, 202, 203, 205, 207, and 208 of title 18, United States Code.

SEC. 5207. POWERS OF THE COUNCIL.

15 USC 4806.

(a) **HEARINGS.**—The Council may, for the purpose of carrying out the provisions of this subtitle, hold such hearings, sit and act at such times and places, take such testimony, and receive such evidence, as the Council considers appropriate. The Council may administer oaths or affirmations to witnesses appearing before the Council.

(b) **INFORMATION.**—

(1)(A) Except as provided in subparagraph (B), the Council may secure directly from any Federal agency information necessary to enable the Council to carry out the provisions of this subtitle. Upon request of the chairman of the Council, the head of such agency shall promptly furnish such information to the Council.

(B) Subparagraph (A) does not apply to matters that are specifically authorized under criteria established by an Executive order to be kept secret in the interest of national defense or foreign policy and are in fact properly classified pursuant to such Executive order.

(2) In any case in which the Council receives any information from a Federal agency, the Council shall not disclose such

Classified
information.
Defense and
national
security.

information to the public unless such agency is authorized to disclose such information pursuant to Federal law.

(d) **CONSULTATION WITH THE PRESIDENT AND THE CONGRESS.**—No later than 60 days after the initial members are appointed to the Council, the Council shall submit a report to the President, the Senate Governmental Affairs Committee, and the appropriate committees of the House of Representatives and of the Senate, that proposes the type and scope of activities the Council shall undertake, including the extent to which the Council will coordinate activities with other advisory committees relating to trade and competitiveness in order to maximize the effectiveness of the Council.

(e) **GIFTS.**—The Council may accept, use, and dispose of gifts or donations of services or property.

(f) **USE OF THE MAIL.**—The Council may use the United States mails in the same manner and under the same conditions as other Federal agencies.

(g) **ADMINISTRATIVE AND SUPPORT SERVICES.**—The Administrator of General Services shall provide to the Council, on a reimbursable basis, such administrative and support services as the Council may request.

(h) **SUBCOUNCILS.**—

(1) The Council may establish, for such period of time as the Council determines appropriate, subcouncils of public and private leaders to analyze specific competitive issues.

(2) Any such subcouncil shall include representatives of business, labor, government, and other individuals or representatives of groups whose participation is considered by the Council to be important to developing a full understanding of the subject with which the subcouncil is concerned.

(3) Any such subcouncil shall include a representative of the Federal Government.

(4) Any such subcouncil shall assess the actual or potential competitiveness problems facing the industry or the specific policy issues with which the subcouncil is concerned and shall formulate specific recommendations for responses by business, government, and labor—

(A) to encourage adjustment and modernization of the industry involved;

(B) to monitor and facilitate industry responsiveness to opportunities identified under section 5208(b)(1)(B);

(C) to encourage the ability of the industry involved to compete in markets identified under section 5208(b)(1)(C); or

(D) to alleviate the problems in a specific policy area facing more than one industry.

(5) Any discussion held by any subcouncil shall not be considered to violate any Federal or State antitrust law.

(6) Any discussion held by any subcouncil shall not be subject to the provisions of the Federal Advisory Committee Act, except that a Federal representative shall attend all subcouncil meetings.

(7) Any subcouncil shall terminate 30 days after making recommendations, unless the Council specifically requests that the subcouncil continue in operation.

(i) **APPLICABILITY OF ADVISORY COMMITTEE ACT.**—The provisions of subsections (e) and (f) of section 10, of the Federal Advisory Committee Act shall not apply to the Council.

Termination
date.

SEC. 5208. ANNUAL REPORT.

15 USC 4807.

(a) **SUBMISSION OF REPORT.**—The Council shall annually prepare and submit to the President, the Senate Governmental Affairs Committee, and the appropriate Committees of the House of Representatives and the Senate a report setting forth—

- (1) the goals to achieve a more competitive United States economy;
- (2) the policies needed to meet such goals;
- (3) a summary of existing policies of the Federal Government or State and local governments significantly affecting the competitiveness of the United States economy; and
- (4) a summary of significant economic and technological developments, in the United States and abroad, affecting the competitive position of United States industries.

(b) **CONTENTS OF REPORT.**—The report submitted under subsection (a) shall—

- (1) identify and describe actual or foreseeable developments, in the United States and abroad, which—

(A) create a significant likelihood of a competitive challenge to, or of substantial dislocation in, an established United States industry;

(B) present significant opportunities for United States industries to compete in new geographical markets or product markets, or to expand the position of such industries in established markets; or

(C) create a significant risk that United States industries shall be unable to compete successfully in significant markets;

- (2) specify the industry sectors affected by the developments described in the report under paragraph (1); and

(3) contain a statement of the findings and recommendations of the Council during the previous fiscal year, including any recommendations of the Council for (a) such legislative or administrative actions as the Council considers appropriate, and (b) including the elimination, consolidation, reorganization of government agencies especially such agencies that specifically deal with research, science, technology, and international trade.

(c) **REPORT BY CONGRESSIONAL COMMITTEES.**—The Council shall consult with each committee to which a report is submitted under this section and after such consultation, each such committee shall submit to its respective House a report setting forth the views and recommendations of such committee with respect to the report of the Council.

SEC. 5209. AUTHORIZATION OF APPROPRIATIONS.

15 USC 4808.

There are authorized to be appropriated for each of the fiscal years 1989 and 1990 such sums as may be necessary not to exceed \$5,000,000 to carry out the provisions of this subtitle.

SEC. 5210. DEFINITIONS.

15 USC 4809.

For purposes of this subtitle—

(1) the term "Council" means the Competitiveness Policy Council established under section 5203;

(2) the term "member" means a member of the Competitiveness Policy Council;

(3) the term "United States" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, the Virgin Islands, the Commonwealth of the Northern Mariana Islands, American Samoa, and any other territory or possession of the United States; and

(4) the term "agent of a foreign principal" is defined as such term is defined under subsection (d) of the first section of the Foreign Agents Registration Act of 1938 (22 U.S.C. 611) subject to the provisions of section 3 of such Act (22 U.S.C. 613).

PART II—STUDIES

2 USC 194b.

SEC. 5421. COMPETITIVENESS IMPACT STATEMENTS.

(a) The President or the head of the appropriate department or agency of the Federal Government shall include in every recommendation or report made to the Congress on legislation which may affect the ability of United States firms to compete in domestic and international commerce a statement of the impact of such legislation on—

(1) the international trade and public interest of the United States, and

(2) the ability of United States firms engaged in the manufacture, sale, distribution, or provision of goods or services to compete in foreign or domestic markets.

(b) This section provides no private right of action as to the need for or adequacy of the statement required by subsection (a).

(c) This section shall cease to be effective six years from the date of enactment.

Termination date.

15 USC 4603a.

SEC. 5422. STUDY AND REPORT BY THE ADVISORY COUNCIL ON FEDERAL PARTICIPATION IN SEMATECH.

(a) **STUDY AND REPORT.**—Not later than February 1, 1989, and annually thereafter for each fiscal year in which appropriated funds are expended for Sematech the Advisory Council on Federal Participation in Sematech established under section 273(a) of the National Defense Authorization Act for fiscal years 1988 and 1989 (15 U.S.C. 4603(a); Public Law 100-180) shall conduct a study and submit a report to the Governmental Affairs Committee and the Armed Services Committee of the Senate and to appropriate committees of the House of Representatives concerning Federal participation in Sematech. The study and report shall be conducted under the direction of the Under Secretary of Commerce for Economic Affairs.

(b) **COUNCIL RECOMMENDATIONS AND REPORT.**—The Council shall include in the report submitted under subsection (a) the following:

(1) identification of potential sources of Federal funding from department and agency budgets for Sematech and recommendations concerning methods and terms of Federal financial participation in Sematech, including grants, loans, loan guarantees, and contributions in kind. The feasibility of methods of Federal recoupment shall also be considered;

(2) definition and assessment of continued Federal participation in Sematech including, but not limited to, issues of technology research and development, civilian and defense industrial base objectives and initiatives, and commercialization. The report shall include a summary of the most recent plans, milestones, and cost estimates for Sematech, including any changes and alterations, and shall comment on Sematech's accomplishments and shortfalls in the preceding fiscal year;

(3) coordination of inter-agency participation, including all matters pertaining to Federal funding and decisionmaking, and other issues regarding Federal participation in Sematech; and

(4) any other issues and questions the Council deems appropriate shall be considered.

National Science
Foundation
University
Infrastructure
Act of 1988.
Research and
development.
Schools and
colleges.
Museums.
42 USC 1861
note.
42 USC 1862a.

Subtitle E—National Science Foundation University Infrastructure

SEC. 4401. SHORT TITLE.

This subtitle may be cited as the "National Science Foundation University Infrastructure Act of 1988".

SEC. 4402. NATIONAL SCIENCE FOUNDATION ACADEMIC RESEARCH FACILITIES MODERNIZATION PROGRAM.

(a) **PURPOSE.**—It is the purpose of this section to assist in modernizing and revitalizing the Nation's research facilities at institutions of higher education, independent nonprofit research institutions and research museums through capital investments.

(b) **ESTABLISHMENT OF PROGRAM.**—To carry out this purpose, the National Science Foundation shall establish and carry out an Academic Research Facilities Modernization Program, under which awards shall be made to institutions of higher education, independent nonprofit research institutions and research museums, and consortia thereof, for the repair, renovation, or replacement (as appropriate) of such institutions' obsolete laboratories and other research facilities.

(c) **PROJECTS AND FUNDING.**—(1) The Academic Research Facilities Modernization Program established by the National Science Foundation pursuant to subsection (b) shall be carried out, through projects—

(A) which involve the repair, renovation, or replacement (as appropriate) of specific research facilities at the eligible institutions or consortia thereof involved, and

(B) for which funds are awarded in response to specific proposals submitted by such eligible institutions or consortia thereof in accordance with regulations prescribed by the Director of the Foundation, pursuant to subsection (d), with the objective of carrying out the purpose of this section.

(2) The regulations so prescribed shall contain such terms, conditions, and guidelines as may be necessary in the light of that objective, but shall in any event provide that—

(A) funds to carry out the program will be awarded to an institution after a comprehensive review using established Foundation procedures, and

(B) the funds so awarded to any eligible institution or consortia thereof will be in an amount equal to not more than 50 percent of the cost of the repair, renovation, or replacement involved (with the funds required to meet the remainder of such cost being provided by the institution involved or consortia thereof or from other non-Federal public or private sources).

(d) **CRITERIA FOR AWARDS.**—(1) Annually, or prior to the issuance of a program announcement for solicitation of proposals for the award of funds to any institution or consortia thereof for a project under the National Science Foundation Academic Research Facilities Modernization Program, the National Science Foundation shall publish in the Federal Register interim guidelines for public review and comment for a period of 60 days. Such guidelines shall include (but not be limited to) the following:

(A) specific definitions for the terms: facilities, instrumentation, equipment, repair, renovation, and replacement;

(B) specific selection criteria to be used in evaluating the scientific merit of proposals and, in making awards to an institution or to consortia thereof, including an analysis of the age and condition of existing research facilities; and

(C) specific provisions for matching the Federal grant pursuant to subsection (b).

(2) Final guidelines shall be published in the Federal Register 60 days following the close of the comment period incorporating such appropriate revisions as may arise from comments received during the review period. The guidelines, at a minimum, shall include selection criteria for the following:

Federal
Register,
publication.

Federal
Register,
publication.

(A) the quality of the research and training to be carried out in the facility or facilities involved;

(B) the congruence of the institution's research and training activities with the future research needs of the Nation and the training and research mission of the National Science Foundation;

(C) the contribution which the project will make toward meeting national, regional, and the institution's research and related training needs; and

(D) the need for the proposed repair, renovation, or replacement (as appropriate) based on an analysis of the age and condition of existing research facilities and equipment.

(e) **DISTRIBUTION OF FUNDS.**—Awards made under the National Science Foundation Academic Research Facilities Modernization Program shall not exceed \$5,000,000 to any institution or consortium over any period of 5 years for the repair, renovation, or replacement (as appropriate) of academic research facilities.

Grants.

(f) **CONSULTATIONS.**—In prescribing criteria and conducting the program under this section, the Director of the National Science Foundation shall consult with the Secretary of Education and other related agencies.

(g) **RESERVATIONS FOR CERTAIN INSTITUTIONS.**—(1) At least 15 percent of the amount which is appropriated pursuant to this section in any fiscal year shall be available only for awards to universities, colleges, and research museums that received less than \$10,000,000 in total Federal obligations for research and development (including obligations for the activities authorized in this section and section 6403) in each of the two preceding fiscal years.

Grants.

(2) Of the amounts appropriated under this section in each fiscal year at least 10 percent of the funds shall be reserved for institutions of higher education servicing a substantial percentage of students who are Black Americans, Native Americans, Hispanic Americans, Alaskan Natives (Eskimos or Aleut), Native Hawaiian, American Samoan, Micronesian, Guamanian (Chamorro), Northern Marianian, or Palauan.

Minorities.
Indians.

(3) Requirements of paragraph (2) may be satisfied by considering the funds awarded under paragraph (1) to the institutions described in paragraph (2).

(h) **AUTHORIZATION OF APPROPRIATIONS.**—There are authorized to be appropriated \$85,000,000 for fiscal year 1989 to carry out the National Science Foundation Academic Research Facilities Modernization Program. Such sums shall be available for that Program every year thereafter subject to the authorizations and appropriations of activities for the National Science Foundation.

42 USC 1862b.

SEC. 6403. NATIONAL SCIENCE FOUNDATION COLLEGE SCIENCE INSTRUMENTATION PROGRAM.

(a) **PURPOSE.**—It is the purpose of this section to assist in revitalizing the Nation's academic instructional instrumentation at colleges.

(b) **ESTABLISHMENT OF PROGRAM.**—To carry out this purpose, the National Science Foundation shall establish and carry out the College Science Instrumentation Program, under which awards are made only to two-year and community colleges and four-year, non-Ph.D. degree-granting institutions or consortia thereof for the purchase of instructional instrumentation.

(c) **PROJECTS AND FUNDING.**—(1) The College Science Instrumentation Program established by the National Science Foundation pursuant to subsection (b) shall be carried out, through projects—

(1) which involve the purchase and replacement (as appropriate) of specific instructional instrumentation at the institutions involved, and

(2) for which funds are awarded in response to specific proposals submitted by such institutions or consortia thereof on a competitive basis in accordance with regulations prescribed by the Director of the Foundation with the objective of carrying out the purposes of this Act.

(2) The regulations so prescribed shall contain such terms, conditions, and guidelines as may be necessary in the light of that objective, but shall in any event provide that—

Regulations.

(A) funds to carry out the program will be awarded to an institution or consortia thereof after a comprehensive review using established Foundation procedures, and

(B) the funds so awarded to any academic institution will be in an amount equal to not more than 50 percent of the cost of the purchase and replacement involved (with the funds awarded to meet the remainder of such cost being provided by the institution involved or from other non-Federal public or private sources).

(d) **CRITERIA FOR AWARDS.**—The National Science Foundation will evaluate proposals on the basis of the following criteria:

(1) **PERFORMANCE COMPETENCE.**—This criterion relates to the capacity of the investigator or investigators, the technical soundness of the proposed approach, the adequacy of the institutional resources available, and the proposed recent research/science education performance.

(2) **INTRINSIC MERIT.**—This criterion relates to the quality, currency, and significance of the scientific content and related instructional activity of the project within the context of undergraduate science, mathematics, and engineering education.

(3) **UTILITY OR RELEVANCE.**—This criterion relates to the impact the project will have at the proposing institution, and the relevance of the project in the local context.

(4) **EFFECT ON THE INFRASTRUCTURE OF SCIENCE AND ENGINEERING.**—This criterion relates to the potential of the proposed project to contribute to better understanding or improvement of the quality, distribution, effectiveness of the Nation's scientific and engineering research, education, and manpower base.

(e) **CONSULTATIONS.**—In prescribing regulations and conducting the program under this section, the Director of the National Science Foundation shall consult with the Secretary of Education and other related agencies.

(f) **AUTHORIZATION OF APPROPRIATIONS.**—Such sums shall be available for the College Science Instrumentation Program subject every year to the authorizations and appropriations for the National Science Foundation.

PUBLIC LAW 100-441—SEPT. 22, 1988

CONTINENTAL SCIENTIFIC DRILLING
AND EXPLORATION ACT

102 STAT. 1760

PUBLIC LAW 100-441—SEPT. 22, 1988

Public Law 100-441
100th Congress

An Act

Sept. 22, 1988
[S. 52]

To direct the cooperation of certain Federal entities in the implementation of the Continental Scientific Drilling Program.

Continental
Scientific
Drilling and
Exploration Act.
Energy.
Minerals and
mining.
Research and
development.
Hazardous
materials.
43 USC 31 note.
43 USC 31 note.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Continental Scientific Drilling and Exploration Act".

SEC. 2. PURPOSES.

The purpose of this Act is to—

(1) implement section 323 of the joint resolution entitled "Joint Resolution making continuing appropriations for the fiscal year 1985, and for other purposes", approved October 12, 1984 (Public Law 98-473; 98 Stat. 1875) which supports and encourages the development of a national Continental Scientific Drilling Program;

(2) enhance fundamental understanding of the composition, structure, dynamics, and evolution of the continental crust, and how such processes affect natural phenomena such as earthquakes, volcanic eruptions, transfer of geothermal energy, distribution of mineral deposits, the occurrence of fossil fuels, and the nature and extent of aquifers;

(3) advance basic earth sciences research and technological development;

(4) obtain critical data regarding the earth's crust relating to isolation of hazardous wastes; and

(5) develop a long-range plan for implementation of the Continental Scientific Drilling Program.

43 USC 31 note.

SEC. 3. FINDINGS.

Congress finds that—

(1) because the earth provides energy, minerals, and water, and is used as a storage medium for municipal, chemical, and nuclear waste, an understanding of the processes and structures in the earth's crust is essential to the well being of the United States;

(2) there is a need for developing long-range plans for a United States Continental Scientific Drilling Program; and

(3) the Continental Scientific Drilling Program would enhance—

(A) understanding of the crustal evolution of the earth and the mountain building processes;

(B) understanding of the mechanisms of earthquakes and volcanic eruptions and the development of improved techniques for prediction;

(C) understanding of the development and utilization of geothermal and other energy sources and the formation of and occurrence of mineral deposits;

(D) understanding of the migration of fluids in the earth's crust for evaluation of waste contamination and the development of more effective techniques for the safe subsurface disposal of hazardous wastes;

(E) understanding and definition of the size, source, and more effective use of aquifers and other water resources; and

(F) evaluation and verification of surface geophysical techniques needed for exploring and monitoring the earth's crust.

SEC. 4. IMPLEMENTATION OF CONTINENTAL SCIENTIFIC DRILLING PROGRAM. 43 USC 31 note.

The Secretary of the Department of Energy, the Secretary of the Department of the Interior through the United States Geological Survey, and the Director of the National Science Foundation shall implement the policies of section 323 of the joint resolution entitled "Joint Resolution making continuing appropriations for the fiscal year 1985, and for other purposes", approved October 12, 1984 (Public Law 98-473; 98 Stat. 1875) by—

(1) taking such action as necessary to assure an effective, cooperative effort in furtherance of the Continental Scientific Drilling Program of the United States;

(2) taking all reasonable administrative and financial measures to assure that the Interagency Accord on Continental Scientific Drilling continues to function effectively in support of such program;

(3) assuring the continuing effective operation of the Interagency Coordinating Group to further the objectives of such program;

(4) taking such action to assure that the Interagency Coordinating Group receives appropriate cooperation from any Federal agency that can contribute to the objectives of such program, without adversely affecting any program or activity of such agency;

(5) acting through the Interagency Coordinating Group, preparing and submitting to the Congress, within one hundred and eighty days after the enactment of this Act a report describing—

Reports.

(A) long and short-term policy objectives and goals of the United States Continental Scientific Drilling Program;

(B) projected schedules of desirable scientific and engineering events that would advance United States objectives in the Continental Scientific Drilling Program;

(C) the levels of resources and funding for fiscal year 1989 that would be required by each participating Federal agency to carry out events pursuant to subparagraphs (A) and (B);

(D) the scientific, economic, technological, and social benefits expected to be realized through the implementation of such program at each level described in subparagraph (C);

(E) a recommended course for interaction with the international community in a cooperative effort to achieve the goals and purposes of this Act;

(F) the extent of participation or interest shown to date in the Continental Scientific Drilling Program by—

- (i) any other governmental agency;
- (ii) any academic institution;
- (iii) any organization in the private sector; and
- (iv) any governmental or other entity in the international community;

(G) a plan to develop beneficial cooperative relationships among the entities mentioned in subparagraph (F), to the extent that the Interagency Coordinating Group deems practicable; and

(H) any other information or recommendations that the Interagency Coordinating Group deems appropriate; and

Reports.

(6) submitting to the Congress annually, beginning one year after the submission of a report under paragraph (5), a report describing the levels of resources and funding that would be required by each participating Federal agency for the next fiscal year to carry out events pursuant to paragraph (5) (A) and (B).

Approved September 22, 1988.

LEGISLATIVE HISTORY—S. 52 (H.R. 2737):

HOUSE REPORTS: No. 100-580, Pt. 1 (Comm. on Interior and Insular Affairs) and Pt. 2 (Comm. on Science, Space, and Technology), both accompanying H.R. 2737.

SENATE REPORTS: No. 100-67 (Comm. on Energy and Natural Resources).

CONGRESSIONAL RECORD:

Vol. 133 (1987): June 17, considered and passed Senate.

Vol. 134 (1988): May 23, H.R. 2737 considered and passed House; proceedings vacated and S. 52, amended, passed in lieu.

June 10, Senate concurred in House amendment with an amendment.

Sept. 9, House concurred in Senate amendment.

102 STAT. 2304

PUBLIC LAW 100-476—OCT. 6, 1988

Public Law 100-476
100th Congress

An Act

Oct. 6, 1988
[H.R. 4419]

To authorize appropriations for activities under the Federal Fire Prevention and Control Act of 1974.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 17 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. 2216) is amended by adding at the end the following new subsection:

"(g)(1) Except as otherwise specifically provided with respect to the payment of claims under section 11 of this Act, there are authorized to be appropriated to carry out the purposes of this Act—

"(A) \$17,039,000 for the fiscal year ending September 30, 1989;

"(B) \$17,737,000 for the fiscal year ending September 30, 1990;

and

"(C) \$18,464,000 for the fiscal year ending September 30, 1991.

"(2) Of the amounts referred to in paragraph (1), not more than \$4,150,000 is authorized to be appropriated for each fiscal year for National Emergency Training Center site administration."

Safety.
Deaf persons.

SEC. 2. (a) The Administrator of the United States Fire Administration shall conduct a study concerning the quality, availability, and degree of use of fire prevention systems for the hearing impaired population. In particular such study shall—

(1) evaluate the quality of equipment for the hearing impaired;

(2) assess the extent, adequacy, and status of research on ways to improve the quality of such equipment;

(3) evaluate the availability of such equipment and the extent to which it is being used in houses, apartments, hotels, and public buildings; and

(4) determine the degree to which such equipment is required by States and model codes.

Reports.

(b) The Administrator shall, not later than January 1, 1989, complete such study and transmit to the Congress a report on the results of the study, together with recommendations on how fire alarm and detection systems for the hearing impaired can be improved and how the use of such systems can be encouraged, including the appropriate Federal role in doing so.

Approved October 6, 1988.

LEGISLATIVE HISTORY—H.R. 4419:

HOUSE REPORTS: No. 100-589 (Comm. on Science, Space, and Technology).

SENATE REPORTS: No. 100-435 (Comm. on Commerce, Science, and Transportation).

CONGRESSIONAL RECORD, Vol. 134 (1988):

May 24, considered and passed House.

Aug. 10, considered and passed Senate, amended.

Sept. 26, House concurred in Senate amendment.

PUBLIC LAW 100-519—OCT. 24, 1988

102 STAT. 2589

Public Law 100-519
100th Congress

An Act

To authorize appropriations to the Secretary of Commerce for the programs of the National Bureau of Standards for fiscal year 1989, and for other purposes.

Oct. 24, 1988
[H.R. 4417]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY AUTHORIZATION

National
Institute of
Standards and
Technology
Authorization
Act for Fiscal
Year 1989.

SECTION 101. SHORT TITLE.

This title may be cited as the "National Institute of Standards and Technology Authorization Act for Fiscal Year 1989".

SEC. 102. AUTHORIZATIONS FOR PROGRAM ACTIVITIES.

(a) **AUTHORIZATIONS.**—There are authorized to be appropriated to the Secretary of Commerce (hereafter in this Act referred to as the "Secretary"), for fiscal year 1989, to carry out activities performed by the National Institute of Standards and Technology, the sums set forth in the following line items:

- (1) Measurement Research and Standards, \$43,220,000.
- (2) Materials Science and Engineering, \$24,054,000.
- (3) Engineering Measurements and Standards, \$49,098,000.
- (4) Computer Science and Technology, \$11,000,000.
- (5) Research Support Activities, \$20,867,000.
- (6) Cold Neutron Source Facility, \$6,500,000 (for a total authorization of \$19,500,000).
- (7) Technology Services, \$3,300,000.

(b) **LIMITATIONS.**—Notwithstanding any other provision of this or any other Act—

(1) of the total of the amounts authorized under subsection (a), \$2,000,000 is authorized only for steel technology;

(2) of the total amount authorized under paragraph (3) of subsection (a)—

(A) \$4,000,000 is authorized only for the Center for Building Technology, and

(B) \$6,000,000 is authorized only for the Center for Fire Research,

and the two Centers shall not be merged;

(3) of the total amount authorized under paragraph (5) of subsection (a), \$7,500,000 is authorized only for the technical competence fund; and

(4) of the amount authorized under paragraph (7) of subsection (a)—

(A) \$3,000,000 is authorized only for the support of Regional Centers for the Transfer of Manufacturing Technology, and Assistance to State Technology Programs;

(B) \$300,000 is authorized only for the evaluation of non-energy-related inventions and related technology extension activities; and

(C) funds authorized under subparagraph (A) shall be used only to award, amend, or renew research cooperative agreements entered into pursuant to the competitive process established by the National Bureau of Standards for this program (53 Fed. Reg. 27060; July 18, 1988).

(c) **TRANSFERS.**—(1) Funds may be transferred among the line items listed in subsection (a), so long as the net funds transferred to or from any line item do not exceed 10 percent of the amount authorized for that line item in such subsection and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives are notified in advance of any such transfer.

(2) In addition, the Secretary may propose transfers to or from any line item exceeding 10 percent of the amount authorized for the line item in subsection (a); but such proposed transfer may not be made—

(A) unless a full and complete explanation of any such proposed transfer and the reason therefore are transmitted in writing to the Speaker of the House of Representatives, the President of the Senate, and the appropriate authorizing committees of the House of Representatives and the Senate, and

(B) 30 calendar days have passed following the transmission of such written explanation.

(d) **PUBLICATION IN FEDERAL REGISTER.**—The requirement of section 25(c)(2) of the Act of March 3, 1901, shall be considered to have been met by the publication made by the National Bureau of Standards on July 18, 1988 (53 Fed. Reg. 27060).

SEC. 103. UNDER SECRETARY FOR TECHNOLOGY.

In addition to any sums otherwise authorized by this title, there are authorized to be appropriated to the Secretary for fiscal year 1989—

(1) \$1,000,000 for the activities of the Office of the Under Secretary of Commerce for Technology, as established in section 201(a); and

(2) \$2,000,000 for the activities of the Office of Technology Policy, as established in such section.

SEC. 104. JAPANESE TECHNICAL LITERATURE.

In addition to any sums otherwise authorized by this title, there is authorized to be appropriated to the Secretary for fiscal year 1989 the sum of \$1,000,000 to carry out the purposes of the Japanese Technical Literature Act of 1986 (Public Law 99-382; 100 Stat. 811).

SEC. 105. SALARY ADJUSTMENTS.

In addition to any sums otherwise authorized by this title, there are authorized to be appropriated to the Secretary for fiscal year 1989 such additional sums as may be necessary to make any adjustments in salary, pay, retirement, and other employee benefits which may be provided for by law.

SEC. 104. AVAILABILITY OF APPROPRIATIONS.

Appropriations made under the authority provided in this title shall remain available for obligation, for expenditure, or for obligation and expenditure for periods specified in the Acts making such appropriations.

SEC. 107. RESEARCH INFORMATION CENTER.

The Research Information Center of the National Bureau of Standards shall be maintained as a governmental activity under the National Institute of Standards and Technology.

SEC. 108. EVALUATED ENGINEERING DATA STUDY.

Within 6 months after the date of the enactment of this Act, the Director of the National Institute of Standards and Technology shall conduct a study of needs within the private and public sectors for evaluated engineering data, and shall submit a report to the Congress making recommendations concerning the appropriate roles of the National Institute of Standards and Technology, other government agencies, professional societies, and trade associations in the collection, evaluation, and dissemination of such data. Such recommendations shall, among other things, address plans for the dissemination of the results of the study through data bases, and plans for incorporating high quality results from other countries.

Reports.

SEC. 109. TECHNOLOGY SERVICES.

In addition to such other technology services and technology extension activities which may be mandated or authorized by law, and in order to help improve the use of technology by small and medium-sized industrial firms within the United States, the Director of the National Institute of Standards and Technology, as appropriate, shall—

Small business.
State and local
governments.
15 USC 272a.

(1) work directly with States, local governments, and other appropriate organizations to provide for extended distribution of Standard Reference Materials, Standard Reference Data, calibrations, and related technical services and to help transfer other expertise and technology to the States and to small businesses and other businesses within the States;

(2) evaluate those inventions from small businesses or individuals which have a significant potential for improving competitiveness;

(3) provide support for workshops on technical and entrepreneurial topics and share information developed through the Malcolm Baldrige Quality Award Program; and

(4) work with other Federal agencies to provide technical and related assistance to the States and businesses within the States.

SEC. 110. TECHNOLOGY TRANSFER.

Within 6 months after the date of the enactment of this Act, the Director of the National Institute of Standards and Technology shall report to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives on domestic technology transfer accomplishments, trends, and plans since 1986 at the National Bureau of Standards and the National Institute of Standards and Technology. Such report shall describe with examples the types of technology transfer undertaken by the National Bureau of Stand-

Reports.

ards or the National Institute of Standards and Technology, the amount of funds devoted to these efforts, and patent and licensing activities related to the National Bureau of Standards and the National Institute of Standards and Technology research results. The report shall describe the division of technology transfer activities between the Gaithersburg, Maryland, and Boulder, Colorado, sites of the National Institute of Standards and Technology. The merits of establishing a technology transfer office in Boulder or of giving the Boulder laboratories increased technology transfer responsibilities shall also be considered.

15 USC 272b.

SEC. 111. ANNUAL BUDGET SUBMISSION.

The National Institute of Standards and Technology shall annually submit to the Congress, at the time of the release of the President's budget, a three year budget estimate for the Institute, including funding estimates for each major account and new initiative.

15 USC 272 note.

SEC. 112. INTERNATIONAL STANDARDS.

Gifts and
property.

(a) **PROGRAM.**—The Secretary, acting through the Director of the National Institute of Standards and Technology and other appropriate officials, shall seek funding for and establish, within 6 months after the date of the enactment of this Act, a program to assist other countries in the development of their domestic standards which are compatible with standards in general use in the United States. After the program is established, it shall be funded through voluntary contributions from the private sector to fully reimburse the United States for expenses incurred during fiscal years 1989 and 1990. The program shall begin on a pilot basis focusing on one or two countries or groups of countries which are major United States trading partners and have expressed interest in such program. The Secretary shall ensure that contributions which are earmarked by country are spent to assist the development of standards by that country or group of countries.

(b) **LONG-TERM PLAN.**—No later than June 30, 1989, the Secretary shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a long-term plan for assistance under this section for each nation or group of nations which annually has imports of at least \$1,000,000,000 from the United States (or has the potential for being a major importer from the United States) and which desires such assistance. The plan shall include a description of the resources needed to provide such assistance, the appropriate and likely sources of such funds, and the appropriate relationship between the program established under this section and private sector standards organizations. Special consideration is to be given to the feasibility of establishing a data base and other methods for making standards information-developed in cooperation with one country available to other countries.

TITLE II—TECHNOLOGY ADMINISTRATION IN THE DEPARTMENT OF COMMERCE

Subtitle A—Technology Administration

SEC. 201. TECHNOLOGY ADMINISTRATION.

(a) **ESTABLISHMENT.**—Section 5(a) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3704(a)) is amended to read as follows:

“(a) **ESTABLISHMENT.**—There is established in the Department of Commerce a Technology Administration, which shall operate in accordance with the provisions, findings, and purposes of this Act. The Technology Administration shall include—

“(1) the National Institute of Standards and Technology;

“(2) the National Technical Information Service; and

“(3) a policy analysis office, which shall be known as the Office of Technology Policy.”

(b) **UNDER SECRETARY AND ASSISTANT SECRETARY.**—Section 5(b) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3704(b)) is amended to read as follows:

“(b) **UNDER SECRETARY AND ASSISTANT SECRETARY.**—The President shall appoint, by and with the advice and consent of the Senate, to the extent provided for in appropriations Acts—

President of U.S.

“(1) an Under Secretary of Commerce for Technology, who shall be compensated at the rate provided for level III of the Executive Schedule in section 5314 of title 5, United States Code; and

“(2) an Assistant Secretary of Commerce for Technology Policy, who shall serve as policy analyst for the Under Secretary.”

(c) **DUTIES.**—Section 5(c) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3704(c)) is amended—

(1) by redesignating paragraphs (1) through (10) as paragraphs (5) through (14), respectively;

(2) by striking “Assistant Secretary, on a continuing basis, shall—” and inserting in lieu thereof “Under Secretary, as appropriate, shall—

“(1) manage the Technology Administration and supervise its agencies, programs, and activities;

“(2) conduct technology policy analyses to improve United States industrial productivity, technology, and innovation, and cooperate with United States industry in the improvement of its productivity, technology, and ability to compete successfully in world markets;

“(3) carry out any functions formerly assigned to the Office of Productivity, Technology, and Innovation;

“(4) assist in the implementation of the Metric Conversion Act of 1975;” and

(3) in paragraph (10), as redesignated by paragraph (1) of this subsection, by striking “Assistant Secretary” and inserting in lieu thereof “Under Secretary”.

(d) **CONFORMING AMENDMENTS.**—(1) Section 4 of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3703) is amended—

(A) in paragraph (1), by striking "Productivity, Technology, and Innovation" and inserting in lieu thereof "Technology Policy"; and

(B) by amending paragraph (3) to read as follows:

"(3) 'Under Secretary' means the Under Secretary of Commerce for Technology appointed under section 5(b)(1)."

(2) Section 5(d)(1) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3704(d)(1)) is amended by striking "shall establish and, through the National Technical Information Service and" and inserting in lieu thereof "and the Under Secretary shall establish, and through the National Technical Information Service and with the cooperation of".

(3) Section 11(g)(1) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710(g)(1)) is amended by inserting "through the Under Secretary, and" after "Secretary,".

(4) Section 5314 of title 5, United States Code, is amended by adding at the end the following item:

"Under Secretary of Commerce for Technology."

(e) **TRANSITION.**—The individual serving as the Assistant Secretary of Commerce for Productivity, Technology, and Innovation immediately before the date of enactment of this Act shall serve as Acting Assistant Secretary of Commerce for Technology Policy until the Assistant Secretary takes office.

15 USC 3704
note.

National
Technical
Information Act
of 1988.

Subtitle B—National Technical Information Service

15 USC 3701
note.

SEC. 211. SHORT TITLE.

This subtitle may be cited as the "National Technical Information Act of 1988".

15 USC 3704b.

SEC. 212. NATIONAL TECHNICAL INFORMATION SERVICE.

(a) **POWERS.**—(1) The Secretary of Commerce, acting through the Director of the National Technical Information Service (hereafter in this subtitle referred to as the "Director") is authorized to do the following:

Contracts.

(A) Enter into such contracts, cooperative agreements, joint ventures, and other transactions, in accordance with all relevant provisions of Federal law applicable to such contracts and agreements, and under reasonable terms and conditions, as may be necessary in the conduct of the business of the National Technical Information Service (hereafter in this subtitle referred to as the "Service").

(B) In addition to the authority regarding fees contained in section 2 of the Act entitled "An Act to provide for the dissemination of technological, scientific, and engineering information to American business and industry, and for other purposes" enacted September 9, 1950 (15 U.S.C. 1152), retain and, subject to appropriations Acts, utilize its net revenues to the extent necessary to implement the plan submitted under subsection (f)(3)(D).

(C) Enter into contracts for the performance of part or all of the functions performed by the Promotion Division of the Service prior to the date of the enactment of this Act. The details of any such contract, and a statement of its effect on the operations and personnel of the Service, shall be provided to the appropriate committees of the Congress 30 days in advance of the execution of such contract.

Contracts.

(D) Employ such personnel as may be necessary to conduct the business of the Service.

An increase or decrease in the personnel of the Service shall not affect or be affected by any ceilings on the number or grade of personnel.

(2) The functions and activities of the Service specified in subsection (e) (1) through (6) are permanent Federal functions to be carried out by the Secretary through the Service and its employees, and shall not be transferred from the Service, by contract or otherwise, to the private sector on a permanent or temporary basis without express approval of the Congress. Functions or activities—

(A) for the procurement of supplies, materials, and equipment by the Service;

(B) referred to in paragraph (1)(C); or

(C) to be performed through joint ventures or cooperative agreements which do not result in a reduction in the Federal workforce of the affected programs of the service,

shall not be considered functions or activities for purposes of this paragraph.

(3) For the purposes of this subsection, the term "net revenues" means the excess of revenues and receipts from any source, other than royalties and other income described in section 13(a)(4) of the Stevenson-Wydler Technology Innovation Act of 1980 (15 U.S.C. 3710c(a)(4)), over operating expenses.

(4) Section 11(h) of the Stevenson-Wydler Technology Innovation Act of 1980 is repealed.

15 USC 3710.

(b) **DIRECTOR OF THE SERVICE.**—The management of the Service shall be vested in a Director who shall report to the Under Secretary of Commerce for Technology and the Secretary of Commerce.

(c) **ADVISORY BOARD.**—(1) There is established the Advisory Board of the National Technical Information Service, which shall be composed of a chairman and four other members appointed by the Secretary.

Establishment.

(2) In appointing members of the Advisory Board the Secretary shall solicit recommendations from the major users and beneficiaries of the Service's activities and shall select individuals experienced in providing or utilizing technical information.

(3) The Advisory Board shall review the general policies and operations of the Service, including policies in connection with fees and charges for its services, and shall advise the Secretary and the Director with respect thereto.

(4) The Advisory Board shall meet at the call of the Secretary, but not less often than once each six months.

(d) **AUDITS.**—The Secretary of Commerce shall provide for annual independent audits of the Service's financial statements beginning with fiscal year 1988, to be conducted in accordance with generally accepted accounting principles.

(e) **FUNCTIONS.**—The Secretary of Commerce, acting through the Service, shall—

Records.
Public
information.

Libraries.

Reports.

Reports.

(1) establish and maintain a permanent repository of nonclassified scientific, technical, and engineering information;

(2) cooperate and coordinate its operations with other Government scientific, technical, and engineering information programs;

(3) make selected bibliographic information products available in a timely manner to depository libraries as part of the Depository Library Program of the Government Printing Office;

(4) in conjunction with the private sector as appropriate, collect, translate into English, and disseminate unclassified foreign scientific, technical, and engineering information;

(5) implement new methods or media for the dissemination of scientific, technical, and engineering information; and

(6) carry out the functions and activities of the Secretary under the Act entitled "An Act to provide for the dissemination of technological, scientific, and engineering information to American business and industry, and for other purposes" enacted September 9, 1950, and the functions and activities of the Secretary performed through the National Technical Information Service as of the date of enactment of this Act under the Stevenson-Wydler Technology Innovation Act of 1980.

(f) NOTIFICATION OF CONGRESS.—(1) The Secretary of Commerce and the Director shall keep the appropriate committees of Congress fully and currently informed about all activities related to the carrying out of the functions of the Service, including changes in fee policies.

(2) Within 90 days after the date of the enactment of this Act, the Secretary of Commerce shall submit to the Congress a report on the current fee structure of the Service, including an explanation of the basis for the fees, taking into consideration all applicable costs, and the adequacy of the fees, along with reasons for the declining sales at the Service of scientific, technical, and engineering publications. Such report shall explain any actions planned or taken to increase such sales at reasonable fees.

(3) The Secretary shall submit an annual report to the Congress which shall—

(A) summarize the operations of the Service during the preceding year, including financial details and staff levels broken down by major activities;

(B) detail the operating plan of the Service, including specific expense and staff needs, for the upcoming year;

(C) set forth details of modernization progress made in the preceding year;

(D) describe the long-term modernization plans of the Service; and

(E) include the results of the most recent annual audit carried out under subsection (d).

(4) The Secretary shall also give the Congress detailed advance notice of not less than 30 calendar days of—

(A) any proposed reduction-in-force;

(B) any joint venture or cooperative agreement which involves a financial incentive to the joint venturer or contractor; and

(C) any change in the operating plan submitted under paragraph (3)(B) which would result in a variation from such plan with respect to expense levels of more than 10 percent.

PUBLIC LAW 100-519—OCT. 24, 1988

102 STAT. 2297

TITLE III—MISCELLANEOUS AMENDMENTS TO STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT OF 1980

SEC. 301. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.

Patents and
Instruments

Section 12 of the Stevenson-Wylder Technology Innovation Act of 1980 (15 U.S.C. 3710a) is amended—

(1) in subsection (a)(2), by striking "at the laboratory and other inventions" and inserting in lieu thereof "or other intellectual property developed at the laboratory and other inventions or other intellectual property"; and

(2) in subsection (b)—

(A) by striking "and" at the end of paragraph (2) and (3);

(B) by redesignating paragraph (4) as paragraph (5); and

(C) by inserting after paragraph (3) the following new paragraph:

"(4) determine rights in other intellectual property developed under an agreement entered into under subsection (a)(1); and".

SEC. 302. REWARDS.

Section 13(1) of the Stevenson-Wylder Technology Innovation Act of 1980 (15 U.S.C. 3710b(1)) is amended by inserting "computer software," after "inventions, innovations,".

SEC. 303. DISTRIBUTION OF ROYALTIES.

(a) Section 14(a)(1)(A) of the Stevenson-Wylder Technology Innovation Act of 1980 (15 U.S.C. 3710c(a)(1)(A)) is amended—

(1) in clause (i), by striking "was an employee of the agency at the time the invention was made" and inserting in lieu thereof "has assigned his or her rights in the invention to the United States"; and

(2) in clause (ii), by striking "who were employed by the agency at the time the invention was made and whose names appear on licensed inventions" and inserting in lieu thereof "under clause (i)".

(b) This section shall be effective as of October 25, 1988.

Effective Date
15 USC 3710c
note.

TITLE IV—DRUG-FREE WORKPLACE

SEC. 401. DRUG-FREE WORKPLACE.

(a) No department, agency, or instrumentality of the United States receiving funds authorized to be appropriated under this Act for fiscal year 1989 or under any other Act authorizing appropriations for fiscal year 1989 for the National Institute of Standards and Technology (hereafter in this section referred to as the "Institute"), shall obligate or expend any such funds, unless the Institute has in place, and will continue to administer in good faith, a written policy designed to ensure that all of its workplaces are free from the illegal use, possession, or distribution of controlled substances (as defined in the Controlled Substances Act) by the officers and employees of the Institute.

(b) No funds so authorized to be appropriated to the Institute for fiscal year 1989 shall be available for payment in connection with any grant, contract, or other agreement, unless the recipient of such

grant, contractor, or party to such agreement, as the case may be, has in place and will continue to administer in good faith a written policy, adopted by such recipient, contractor, or party's board of directors or other governing authority, satisfactory to the Director of the Institute, designed to ensure that all of the workplaces of such recipient, contractor, or party are free from the illegal use, possession, or distribution of controlled substances (as defined in the Controlled Substances Act) by the officers and employees of such recipient, contractor, or party.

Approved October 24, 1988.

LEGISLATIVE HISTORY—H.R. 6417 (S. 2761)

HOUSE REPORTS: No. 100-473, Pt. 1 (Comm. on Science, Space, and Technology) and Pt. 2 (Comm. on Energy and Commerce).

SENATE REPORTS: No. 100-476 accompanying S. 2761 (Comm. on Commerce, Science, and Transportation).

CONGRESSIONAL RECORD, Vol. 134 (1988):

Sept. 28, considered and passed House.

Oct. 5, considered and passed Senate.

PUBLIC LAW 100-570—OCT. 31, 1988

102 STAT. 2865

Public Law 100-570
100th Congress

An Act

To authorize appropriations for the National Science Foundation, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Oct. 31, 1988
[H.R. 4418]

National Science
Foundation
Authorization
Act of 1988.

SHORT TITLE

SECTION 1. This Act may be cited as the "National Science Foundation Authorization Act of 1988".

42 USC 1861
note.

TITLE I—NATIONAL SCIENCE FOUNDATION AUTHORIZATION

AUTHORIZATION OF APPROPRIATIONS

SEC. 101. (a) Congress finds that to strengthen basic research and human resources in science and engineering the programs of the National Science Foundation (hereinafter referred to as the "Foundation") should be adequately funded.

(b) There is authorized to be appropriated to the Foundation \$2,050,000,000 for fiscal year 1989, which shall be available for the following categories:

(1) Research and Related Activities, \$1,653,500,000, which shall be available for the following subcategories:

(A) Mathematical and Physical Sciences, \$507,800,000.

(B) Engineering, \$198,000,000.

(C) Biological, Behavioral, and Social Sciences, \$288,700,000.

(D) Geosciences, \$320,900,000.

(E) Computer and Information Science and Engineering, \$162,100,000.

(F) Science and Technology Research Centers, \$25,000,000.

(G) Scientific, Technological, and International Affairs, \$56,000,000.

(H) Program Development and Management, \$95,000,000.

(2) Science and Engineering Education, \$175,500,000, of which \$17,500,000 shall be available for College Science Instrumentation.

(3) United States Antarctic Program, \$141,000,000.

(4) Academic Research Facilities Modernization, \$80,000,000.

(c) There is authorized to be appropriated to the Foundation \$2,388,000,000 for fiscal year 1990, which shall be available for the following categories:

(1) Research and Related Activities, \$1,910,700,000, which shall be available for the following subcategories:

(A) Mathematical and Physical Sciences, \$588,500,000.

(B) Engineering, \$229,500,000.

- (C) Biological, Behavioral, and Social Sciences, \$334,600,000.
- (D) Geosciences, \$372,000,000.
- (E) Computer and Information Science and Engineering, \$188,000,000.
- (F) Science and Technology Research Centers, \$30,000,000.
- (G) Scientific, Technological, and International Affairs, \$65,000,000.
- (H) Program Development and Management, \$103,100,000.
- (2) Science and Engineering Education, \$205,300,000.
- (3) United States Antarctic Program, \$147,000,000.
- (4) Academic Research Facilities Modernization, \$125,000,000.
- (d) There is authorized to be appropriated to the Foundation \$2,782,000,000 for fiscal year 1991, which shall be available for the following categories:
 - (1) Research and Related Activities, \$2,200,200,000, which shall be available for the following subcategories:
 - (A) Mathematical and Physical Sciences, \$681,500,000.
 - (B) Engineering, \$265,800,000.
 - (C) Biological, Behavioral, and Social Sciences, \$387,400,000.
 - (D) Geosciences, \$430,800,000.
 - (E) Computer and Information Science and Engineering, \$217,600,000.
 - (F) Science and Technology Research Centers, \$30,000,000.
 - (G) Scientific, Technological, and International Affairs, \$75,200,000.
 - (H) Program Development and Management, \$111,900,000.
 - (2) Science and Engineering Education, \$240,200,000.
 - (3) United States Antarctic Program, \$154,100,000.
 - (4) Academic Research Facilities Modernization, \$187,500,000.
- (e) There is authorized to be appropriated to the Foundation \$3,245,000,000 for fiscal year 1992, which shall be available for the following categories:
 - (1) Research and Related Activities, \$2,552,000,000.
 - (2) Science and Engineering Education, \$281,000,000.
 - (3) United States Antarctic Program, \$162,000,000.
 - (4) Academic Research Facilities Modernization, \$250,000,000.
- (f) There is authorized to be appropriated to the Foundation \$3,505,000,000 for fiscal year 1993, which shall be available for the following categories:
 - (1) Research and Related Activities, \$2,772,000,000.
 - (2) Science and Engineering Education, \$308,000,000.
 - (3) United States Antarctic Program, \$175,000,000.
 - (4) Academic Research Facilities Modernization, \$250,000,000.
- (g) Notwithstanding any other provision of this Act—
 - (1) not less than \$5,000,000 of the amount authorized in subsection (b)(2) is authorized only for purposes of teacher training and enhancement and for development of model curriculum tailored for science and mathematics instruction, and instruction in technician training programs, in two-year and community colleges; and

(2) in allocating funds authorized under this section for planning grants for Science and Technology Centers, the Director of the Foundation (hereinafter referred to as the "Director") shall give due consideration to the need to establish centers in geographic areas of the United States in which there is no nationally recognized research university.

(h)(1) If the total amount appropriated for a program category specified in subsections (b) through (f) of this section is less than the total amount authorized to be appropriated for such category under this section, the portion of such appropriated amount that shall be available for spending for each subcategory of such category, and for each program of such category or subcategory for which a funding floor is specified, shall be determined as follows:

(A) For each subcategory, the amount available for spending shall be equal to the amount specified in subsections (b) through (f) for that subcategory, as multiplied by the funding availability percentage.

(B) For each program of any category or subcategory for which a funding floor is specified, the amount available for spending shall be equal to the amount specified in this section as the floor for that program, as multiplied by the funding availability percentage.

(2) For the purposes of this subsection, the term "funding availability percentage" means the percentage determined by dividing—

(A) the total amount appropriated for a program category specified in subsection (b), (c), (d), (e), or (f) of this section by

(B) the total amount authorized under subsection (b), (c), (d), (e), or (f) for that category.

AVAILABILITY OF APPROPRIATIONS

Sec. 102. Appropriations made under authority provided in section 101 of this Act shall remain available for obligation for periods specified in the Acts making the appropriations.

CONSULTATION AND REPRESENTATION EXPENSES

Sec. 103. From appropriations made under authorizations provided in this Act, not more than \$7,500 may be used in each fiscal year for official consultation, representation, or other extraordinary expenses at the discretion of the Director. The determination of the Director will be final and conclusive upon the accounting officers of the Government.

TRANSFER OF FUNDS

Sec. 104. (a) In any given fiscal year, funds may be transferred among the categories listed in section 101, and among subcategories listed in section 101, so long as the net funds transferred to or from any category, or to or from any subcategory, do not exceed 10 percent of the amount authorized for that category or subcategory.

(b) In addition, the Director may propose transfers to or from any category exceeding 10 percent of the amount authorized for that category in section 101, and to or from any subcategory in which the net funds transferred exceed 10 percent of the amount authorized for that subcategory. An explanation of any such proposed transfer must be transmitted in writing to the Committee on Science, Space, and Technology of the House of Representatives, and the Com-

mittees on Labor and Human Resources and Commerce, Science, and Transportation of the Senate. The proposed transfer may be made only when 30 calendar days have passed after transmission of such written explanation.

ADMINISTRATIVE AMENDMENTS

SEC. 105. (a) Section 4 of the National Science Foundation Act of 1950 (42 U.S.C. 1863) is amended by adding at the end thereof the following:

Classified
information.

"(k) Portions of Board meetings in which the Board considers proposed Foundation budgets for a particular fiscal year may be closed to the public until the President's budget for that fiscal year has been submitted to the Congress."

(b) Subsection (c) of section 15 of the National Science Foundation Act of 1950 (42 U.S.C. 1874) is repealed.

(c) Section 36(f) of the Science and Technology Equal Opportunities Act (42 U.S.C. 1885c(f)) is amended to read as follows:

Reports.

"(f) Every two years, the Committee shall prepare and transmit to the Director a report on its activities during the previous two years and proposed activities for the next two years. The Director shall transmit to Congress the report, unaltered, together with such comments as the Director deems appropriate."

TEMPORARY PERSONNEL

SEC. 106. Section 14(a) of the National Science Foundation Act of 1950 (42 U.S.C. 1873(a)) is amended by inserting "(1)" immediately after "(a)", and by adding at the end the following new paragraphs:

Wages.

"(2) The Director may, under the authority provided by paragraph (1) of this subsection and in accordance with such policies as the Board chooses to prescribe, appoint for a limited term, or on a temporary basis, scientists, engineers, and other technical and professional personnel on leave of absence from academic, industrial, or research institutions to work for the Foundation.

"(3) The Foundation may pay, to the extent authorized for certain other Federal employees by section 5723 of title 5, United States Code, travel expenses for any individual appointed for a limited term or on a temporary basis and transportation expenses of his or her immediate family and his or her household goods and personal effects from that individual's residence at the time of selection or assignment to his or her duty station. The Foundation may pay such travel expenses and transportation expenses to the same extent for such an individual's return to the former place of residence from his or her duty station, upon separation from the Federal service following an agreed period of service. The Foundation may also pay a per diem allowance at a rate not to exceed the daily amounts prescribed under section 5702 of title 5, United States Code, to such an individual, in lieu of and when less than transportation expenses of the immediate family and household goods and personal effects, for the period of his or her employment with the Foundation. Notwithstanding any other provision of law, the employer's contribution to any retirement, life insurance, or health benefit plan for an individual appointed for a term of one year or less, which could be extended for no more than one additional year, may be made or reimbursed from appropriations available to the Foundation."

BUDGET ESTIMATES

SEC. 107. Section 14 of the National Science Foundation Act of 1950 (42 U.S.C. 1873) is amended by adding at the end the following new subsection:

"(j) Starting with fiscal year 1990, the Foundation shall submit to the Congress in each fiscal year, at the time of the release of the President's budget, a three-year budget estimate for the Foundation. The three-year budget shall include funding estimates for each major activity, including each scientific directorate, the United States Antarctic Program, the Science and Engineering Education Directorate, and the Program Development and Management activity."

FINANCIAL DISCLOSURE REPORT FOR BOARD MEMBERS

SEC. 108. Section 4 of the National Science Foundation Act of 1950 (42 U.S.C. 1863) is amended by adding at the end the following new subsection:

"(k) Members of the Board shall be required to file a financial disclosure report under title II of the Ethics in Government Act of 1978 (5 U.S.C. App. 92 Stat. 1836), except that such reports shall be held confidential and exempt from any law otherwise requiring their public disclosure."

Classified
information.

EVALUATIONS OF RESEARCH CENTERS

SEC. 109. In carrying out performance reviews of research centers by the Foundation, the Director shall take such action as may be necessary, consistent with the merit review process of the Foundation, to ensure that—

42 USC 1862e.

- (1) members of review panels are free from any conflict of interest; and
- (2) the conditions of each award to such centers have been fulfilled.

RESEARCH CENTER CONSORTIA

SEC. 110. In Foundation programs making grants to research centers, the Director shall encourage the formation of consortia that include research universities, two-year and four-year colleges, and the private sector.

Grants.
42 USC 1862f.

BUY-AMERICAN REQUIREMENTS

SEC. 111. (a) The Director shall, to the maximum extent practicable and consistent with current law, award to domestic firms any contracts for the purchase of goods and services intended for direct use by the Foundation.

Contracts.
42 USC 1870a.

(b) The Director shall, as soon as possible after the date of enactment of this Act, prepare a report on—

Reports.

- (1) the number of Foundation contracts entered into with foreign firms in fiscal year 1988;
- (2) the number of such contracts entered into with domestic firms in that fiscal year;
- (3) the number of contracts entered into with foreign firms where the Foundation also received a technically acceptable bid from a domestic firm; and

(4) any steps the Foundation will take to increase the number of contracts awarded to domestic firms.
Such report shall be submitted to the Committee on Science, Space, and Technology of the House of Representatives and the Committees on Labor and Human Resources and Commerce, Science, and Transportation of the Senate.

(c) For the purposes of this section—

(1) the term "domestic firm" means a business entity which is organized under the laws of the United States or the laws of a State, district, commonwealth, territory, or possession of the United States, and which conducts business operations in the United States; and

(2) the term "foreign firm" means a business entity not described in paragraph (1).

UNDERGRADUATE SCIENCE IMPROVEMENT

20 USC 3911
note.

SEC. 112. (a) The Congress finds that the support of undergraduate science and engineering education is a critical component in a comprehensive national policy intended to ensure the Nation's future supply of scientists and engineers.

Women.
Minorities.
Handicapped
persons.

(b) In accordance with the provisions of this Act, the Foundation shall support undergraduate science and engineering activities in instrumentation and laboratory improvement, undergraduate faculty enhancement, undergraduate research opportunities, undergraduate curriculum development, and efforts to encourage the participation of women, minorities, and the disabled in such fields.

(c) In carrying out the provisions of this section, the Foundation shall take into account the special needs of two-year and four-year colleges and universities.

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

42 USC 1862g.

SEC. 113. (a) The Director shall operate an Experimental Program to Stimulate Competitive Research, the purpose of which is to assist those States that—

(1) historically have received relatively little Federal research and development funding; and

(2) have demonstrated a commitment to develop their research bases and improve science and engineering research and education programs at their universities and colleges.

(b) A State which has received an initial award under such Program, whether or not the award was received before or after the date of enactment of this Act, shall be eligible for up to 5 years of additional support under the program if that State provides assurances of new matching funds and submits an acceptable new plan for using Program funds and matching funds to build the research capabilities of the State.

COLLEGE AND UNIVERSITY INNOVATION RESEARCH

Reports.

SEC. 114. The Director shall prepare and submit, not later than March 1, 1989, a report to the Committee on Labor and Human Resources and Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives on assisting academic researchers at a wide range of colleges and universities, including smaller institutions and institutions which do not traditionally

receive Federal research funds, to pursue high-quality research of economic potential. The report shall—

- (1) describe the procedures, terms, and conditions necessary for the establishment of a program patterned after the Small Business Innovation Research program to assist college and university faculty to pursue research of economic potential;
- (2) analyze the feasibility of establishing funding recoupment mechanisms to offset the cost of such assistance; and
- (3) state whether such a program is appropriate and feasible and, if so, the steps the Director shall take to establish and carry out such a program.

EARTHQUAKE ENGINEERING RESEARCH

Sec. 115. (a) The National Academy of Sciences shall conduct a study of earthquake engineering activities being carried out by the Foundation and other Federal agencies under the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7701 et seq.). Such study shall include—

42 USC 7704
note.

- (1) an assessment of the adequacy of each agency's current Federal earthquake engineering efforts, including those designed to increase the implementation of new techniques; the need for specialized research facilities, including large-scale facilities; the division of responsibilities among the various Federal agencies; and recommended levels of funding that the Foundation and other agencies should provide, in the form of grants to individuals, groups, and centers, to non-Federal researchers principally engaged in earthquake engineering research; and
- (2) recommendations, if any, of the National Academy of Sciences for improvements in the current Federal efforts in the area of earthquake engineering research.

(b) The results of the study required by subsection (a) of this section shall be reported to the Congress on or before the expiration of the 12-month period following the date of enactment of this Act.

Reports.

(c) In carrying out such study, the National Academy of Sciences is authorized to call upon any agency, department, or other instrumentality or entity of the United States for cooperation, and such agency, department, instrumentality, or entity shall provide such cooperation.

DESALINATION REPORT

Sec. 116. The Office of Science and Technology Policy shall prepare and submit a report to the Congress not later than December 1, 1988, on desalination research and technology. The report shall—

- (1) describe the state of desalination research and technology being conducted by agencies of the Federal Government;
- (2) recommend an agency of the Federal Government to be the lead agency on desalination research and technology;
- (3) recommend ways to spur research and technology to decrease the cost of desalination; and
- (4) recommend how desalination research and technology can be used as a component of the foreign assistance program of the United States.

PRESIDENTIAL AWARDS FOR TEACHING EXCELLENCE

42 USC 1881b.

SEC. 117. (a)(1)(A) The President is authorized to make Presidential Awards for Excellence in Mathematics and Science Teaching to kindergarten through grade 12 school teachers of mathematics and science who have demonstrated outstanding teaching ability in the field of teaching mathematics or science.

(B) Each year the President is authorized to make no fewer than 108 awards under subparagraph (A). In selecting teachers for an award authorized by this subsection, the President shall select at least two teachers—

- (i) from each of the several States;
- (ii) from the District of Columbia;
- (iii) from the Commonwealth of Puerto Rico;
- (iv) from among the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and other commonwealths, territories, and possessions of the United States; and
- (v) from the United States Department of Defense Dependents' School.

(2) The President shall carry out this subsection, including the establishment of the selection procedures, after consultation with the Director and other appropriate officials of Federal agencies.

(3)(A) Funds to carry out this subsection for any fiscal year shall be made available from amounts appropriated pursuant to annual authorization of appropriations for the Foundation for Science and Engineering Education.

(B) Amounts made available pursuant to subparagraph (A) shall be available for making awards under this subsection, for administrative expenses, for necessary travel by teachers selected under this subsection, and for special activities related to carrying out this subsection.

(b)(1) Part C of title II of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2701 et seq.), as amended by the Augustus F. Hawkins-Robert T. Stafford Elementary and Secondary School Improvement Amendments of 1988, is amended to read as follows:

**“PART C—PRESIDENTIAL AWARDS FOR TEACHING
EXCELLENCE IN FOREIGN LANGUAGES**

20 USC 3011.

“SEC. 2201. PRESIDENTIAL AWARDS.

“(a) **GENERAL AUTHORITY.**—The President is authorized to make Presidential Awards for Teaching Excellence in Foreign Languages to elementary and secondary school teachers of foreign languages who have demonstrated outstanding teaching ability in the field of teaching foreign languages.

“(b) **LIMITATIONS.**—Each year the President is authorized to make 108 awards under subsection (a). In selecting elementary and secondary school teachers for an award authorized by this section, the President shall select at least one elementary school teacher and one secondary school teacher—

- “(1) from each of the several States;
- “(2) from the District of Columbia;
- “(3) from the Commonwealth of Puerto Rico;
- “(4) from among the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and other

commonwealths, territories, and possessions of the United States; and

"(5) from the United States Department of Defense Dependents' School.

"SEC. 2202. ADMINISTRATIVE PROVISIONS.

20 USC 3012.

"(a) **IN GENERAL.**—There are authorized to be appropriated \$1,000,000 for each fiscal year to carry out this part.

"(b) **AVAILABILITY.**—Amounts appropriated pursuant to subsection (a) shall be available for making awards under this part, for administrative expenses, for necessary travel by teachers selected under this part, and for special activities related to carrying out this part."

(2) The items in the table of contents of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 2701 et seq.) relating to part C of title II are amended to read as follows:

"PART C—PRESIDENTIAL AWARDS FOR TEACHING EXCELLENCE IN FOREIGN LANGUAGES

"Sec. 2201. Presidential awards.

"Sec. 2202. Administrative provisions."

DRUG-FREE WORKPLACE

SEC. 118. (a) No funds authorized to be appropriated under this Act, or under any other Act authorizing appropriations for fiscal year 1989 through 1993 for the Foundation, shall be obligated or expended unless the Foundation has in place, and will continue to administer in good faith, a written policy designed to ensure that all of its workplaces are free from the illegal use, possession, or distribution of controlled substances (as defined in the Controlled Substances Act) by the officers and employees of the Foundation.

42 USC 1875
note.

(b) No funds authorized to be appropriated to the Foundation for fiscal years 1989 through 1993 shall be available for payment in connection with any grant, contract, or other agreement, unless the recipient of such grant, contractor, or party to such agreement, as the case may be, has in place and will continue to administer in good faith a written policy, adopted by the board of directors or other governing authority of such recipient, contractor, or party, satisfactory to the Director of the Foundation, designed to ensure that all of the workplaces of such recipient, contractor, or party are free from the illegal use, possession, or distribution of controlled substances (as defined in the Controlled Substances Act) by the officers and employees of such recipient, contractor, or party.

**TITLE II—ACADEMIC RESEARCH FACILITIES
MODERNIZATION**

Academic
Research
Facilities
Modernization
Act of 1988.

SHORT TITLE

SEC. 201. This title may be cited as the "Academic Research Facilities Modernization Act of 1988".

42 USC 1861
note.

FINDINGS AND PURPOSE

SEC. 202. (a) The Congress finds that—

42 USC 1862a.

(1) the fundamental research and related education program supported by the Federal Government and conducted by the Nation's universities and colleges are essential to our national security, and to our health, economic welfare, and general well-being;

(2) many national research and related education programs conducted by universities and colleges are now hindered by obsolete research buildings and equipment, and many institutions lack sufficient resources to repair, renovate, or replace their laboratories;

(3) the Nation's capacity to conduct high quality research and education programs and to maintain its competitive position at the forefront of modern science, engineering, and technology is threatened by this research capital deficit, which poses serious and adverse consequences to our future national security, health, welfare, and ability to compete in the international marketplace;

(4) a national effort to spur reinvestment in research facilities is needed, and national, State, and local policies and cooperative programs are required that will yield maximum return on the investment of scarce national resources and sustain a commitment to excellence in research and education; and

(5) the Foundation, as part of its responsibility for maintaining the vitality of the Nation's academic research, and in partnership with the States, industry, and universities and colleges, must assist in enhancing the historic linkages between Federal investment in academic research and training and investment in the research capital base by reinvesting in the capital facilities which modern research and education programs require.

(b) It is the purpose of this title to assist in modernizing and revitalizing the Nation's research facilities at institutions of higher education, independent non-profit research institutions and research museums, and consortia thereof, through capital investment.

ESTABLISHMENT OF PROGRAM

42 USC 1862b.

SEC. 203. (a)(1) To carry out this title, the Director shall establish and carry out a new Academic Research Facilities Modernization Program (hereafter in this title referred to as the "Program"), under which awards are made to institutions of higher education, independent nonprofit research institutions, and research museums, and consortia thereof, for the repair, renovation, or, in exceptional cases, replacement of obsolete science and engineering facilities primarily devoted to research.

(2) Such awards shall, consistent with the functions of the Foundation set forth in section 3 of the National Science Foundation Act of 1950 (42 U.S.C. 1862) and through established Foundation selection procedures, serve to—

(A) promote the modernization of graduate academic science and engineering research laboratories and related facilities so as to facilitate and support research in the scientific and engineering disciplines;

(B) assist those academic institutions that historically have received relatively little Federal research and development funds to improve their academic science and engineering infrastructures and broaden and strengthen the Nation's science and engineering base; and

(C) promote the modernization of undergraduate academic science and engineering research laboratories and related facilities so as to facilitate and support research in the scientific and engineering disciplines.

(b)(1) The Program shall be carried out through projects which involve the repair, renovation, or, in exceptional cases, replacement of specific science and engineering facilities devoted primarily to research at eligible institutions, or consortia thereof, and for which funds are awarded in response to specific proposals submitted by such eligible institutions or consortia in accordance with procedures prescribed by the Director pursuant to section 204 of this Act.

(2) Awards made under the Program shall not exceed \$7,000,000 to any institution or consortium over any period of 5 years for the repair, renovation, or, in exceptional cases, replacement of academic research facilities.

(3) The Director shall, in making awards under the Program, consider the extent to which that institution or consortium has received funds for the repair, renovation, construction, or replacement of academic facilities from any other Federal funding source within the 5-year period immediately preceding the application. The Director shall give priority to institutions or consortia that have not received such funds in the preceding 5 years.

(4) The Director shall, in awarding funds under this title, consider the distribution of funds among institutions of different sizes and geographical locations.

(c) Criteria for the award of funds to any institution for a project under the Program shall include—

(1) the quality of the research and training to be carried out in the facility or facilities involved;

(2) the need for the proposed repair, renovation, or, in exceptional cases, replacement based on an analysis of the age and condition of existing research facilities and equipment;

(3) the congruence of the institution's research and training activities with the future research needs of the Nation and the research mission of the Foundation;

(4) the contribution that the project will make toward meeting national, regional, and institutional research and related training needs;

(5) in the case of an institution that historically has received relatively little Federal research and development funding, the contribution the proposed project will make to improving the institution's academic scientific and engineering infrastructure and broadening the Nation's science and engineering base; and

(6) the impact of the award on the overall geographic distribution of awards made under the Program, with the objective of avoiding undue concentration of awards.

PROCEDURES, GUIDELINES, AND PLANNING ACTIVITIES

SEC. 204. (a)(1) The Director shall, consistent with the objectives of the Program and the criteria set forth in section 203(c) of this Act, set forth procedures for the Program. 42 USC 1862c.

(2) The procedures so prescribed shall contain such terms, conditions, and guidelines as may be necessary in the light of Program objectives, but shall in any event provide that—

(A) funds to carry out the Program will be awarded only on the basis of merit after a comprehensive review using established Foundation procedures;

(B) the membership of merit review panels that assess proposals will be broadly representative of eligible institutions, including research universities and predominantly undergraduate and minority institutions;

(C) the institution receiving an award shall provide at least 50 percent of the cost, in cash or in kind, fairly evaluated, of the repair, renovation, or replacement involved and shall provide this contribution from private or non-Federal public sources, except that the Director may accept a match of less than 50 percent, but at least 30 percent, for institutions which are not ranked among the top 100 of the institutions receiving Federal research and development funding, as documented in the latest annual report of the Foundation entitled "Federal Support to Universities, Colleges, and Selected Nonprofit Institutions"; and

(D) to the extent practicable, eligible institutions of a given type will compete against similar institutions for Program awards.

(b) The Director shall conduct comprehensive planning activities, including surveys of research facility needs and other information-gathering activities, necessary to implement the Program and to develop the procedures called for under subsection (a) of this section.

(c) Prior to the issuance of the comprehensive plan required by subsection (d) of this section, and consistent with the Program criteria set forth in section 203(c) of this Act, the Director shall publish in the Federal Register proposed Program guidelines for public review for a comment period of 30 days. Such guidelines shall provide detailed information on eligibility, criteria, terms, and conditions and shall include, but not be limited to—

(1) definitions for the terms "institutions of higher education", "private non-profit research organizations", "research museums", "consortia", "facilities", "facilities primarily devoted to research", "instrumentation", "equipment", "repair", "renovation", and "replacement";

(2) selection criteria to be used by the Foundation in evaluating proposals from institutions and consortia thereof, including criteria for evaluating scientific merit and for evaluating the age and condition of existing research facilities; and

(3) requirements for matching a Program award with contributions from non-Federal sources.

(d) The Director, after gathering appropriate information and after considering comments on the proposed Program guidelines published in the Federal Register pursuant to subsection (c) of this section, shall develop a comprehensive plan for the Program that—

(1) defines the appropriate roles and responsibilities of the Federal Government, institutions of higher education, State governments, private foundations, and other appropriate organizations;

(2) states what procedures will be used to ensure that predominantly undergraduate institutions and colleges and universities that historically have received little Federal research and development funding will receive substantial percentages of the funds awarded under this title;

(3) states the estimated percentage of Program funds available for each category of eligible institutions, including

Federal
Register,
publication.

predominantly undergraduate institutions and colleges and universities that historically have received little Federal research and development funding as well as research universities; and

(4) evaluate and address, to the maximum extent possible, a variety of factors which include—

(A) the unique circumstances and research facilities needs of research universities, undergraduate institutions, and other institutions whose enrollment includes substantial percentages of minorities underrepresented in science and engineering research;

(B) innovative approaches in the management of the Program that address both short-term and long-term aspects of the renovation, repair, and replacement of academic research facilities;

(C) programmatic approaches that recognize and support excellence, strengthen scientific and engineering research potential and, to the maximum extent possible and consistent with the purposes of this Act, assure an equitable distribution of resources with respect to institutions and geographical areas; and

(D) any recommendations necessary to improve the Program and further meet the purposes of this title.

(e) The Director shall prepare and submit, not later than June 15, 1989, a report containing the comprehensive plan required by subsection (d) of this section to the Committee on Labor and Human Resources and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives.

(f) Final guidelines shall be published in the Federal Register not later than 45 days after the submission of the report required under subsection (e).

(g) The Director shall, from amounts available to the Foundation under section 101(h) of this Act for fiscal year 1989, make available an amount, not to exceed \$1,000,000, to carry out the provisions of this section. None of the funds authorized to be appropriated in section 101 of this Act may be used for grant or contract awards under the Program prior to completion and submission to Congress of the comprehensive plan required by subsection (d) of this section.

(h) In conducting the activities under the Program, the Director shall consult with the Secretary of Education and the heads of other related agencies.

SET-ASIDE FOR CERTAIN INSTITUTIONS

Sec. 205. Of the amounts appropriated to the Foundation for the Program, as authorized under section 101 of this Act, in each fiscal year, at least 12 percent shall be reserved for historically Black

Reports

Final
guidelines
published

42 USC 1005a

102 STAT. 2278

PUBLIC LAW 100-570—OCT. 31, 1958

colleges or universities defined as "part B institutions" by section 1002 of the Higher Education Act of 1965 (20 U.S.C. 10612) and other institutions of higher education whose enrollment includes a substantial percentage of students who are Black Americans, Hispanic Americans, or Native Americans.

CONFORMING AMENDMENT

42 USC 1921
encl. (1958a,
1958b)

Sec. 306, Subtitle E of title IV (sections 6401-6403) of the Omnibus Trade and Competitiveness Act of 1988 is repealed.

Approved October 31, 1958.

LEGISLATIVE HISTORY—H.R. 4618 (S. 1422)

HOUSE REPORTS: No. 100-469 (Comm. on Science, Space, and Technology).

SENATE REPORTS: No. 100-145 (Comm. on Labor and Human Resources) and No. 100-351 (Comm. on Commerce, Science, and Transportation), both accompanying S. 1422.

CONGRESSIONAL RECORDS, Vol. 134 (1958)

June 5, considered and passed House.

June 17, S. 1422 considered in Senate; proceedings vacated and H.R. 4618, amended, passed in lieu.

Sept. 27, House concurred in certain Senate amendment, in another with an amendment.

Oct. 14, Senate concurred in House amendment.